The Case for Investment in Early Grade Reading

Georgetown University
Global Human Development Program
Final Report
March 28, 2017

GEORGETOWN UNIVERSITY

Sean Kelly
Jimmy Graham

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Client: Dr. Harry A. Patrinos, Education Practice Manager, East Asia and Pacific Region
Advisor: Dr. Eduardo Velez Bustillo, Professor, Georgetown University

Table of Contents

Acronyms 3
Executive Summary 4
I. Problem and Motivations 5
II. The Importance of Investing Early in Reading 6
1. High Returns to Education 7
2. Increasing Demand for Advanced Skills 8
3. Neuroscience of Literacy Development 10
4. Impediments to Literacy Development in Early Childhood 11
5. Cost-Effectiveness of Early Investment 12
III. Pervasive Illiteracy in Developing Countries 13
1. Increasing Rates of School Attendance 13
2. Approaches to Determining Literacy Rates 15
3. Analysis of PISA Results 16
4. Analysis of EGRA Results 18
5. Schooled and Illiterate 20
IV. A Solution for Mitigating Illiteracy 21
1. Simplifying Instruction 22
2. Using Evidence-Based Curricula 22
3. Training Teachers and Providing Instructional Guidelines 23
4. Following Up With Coaching and Monitoring 24
5. Providing Supplementary Instructional Materials 24
6. Providing Tools and Training for Student Assessment 25
V. Evidence of Impact and Cost-Effectiveness 25
1. Egypt - Girls' Improved Learning Outcomes (GILO) 27
2. Jordan - National Early Grade Literacy and Numeracy Survey 28
3. Kenya - Primary Math and Reading Initiative (PRIMR) 30
4. Liberia Early Grade Reading Assessment Plus (EGRA Plus) 31
5. Liberia Teacher Training Program II (LTTP II) 32
6. Malawi Teacher Professional Development Support Program (MTPDS) 33
7. Nepal Opportunity Schools Initiative 34
8. Reading Education Project for Papua New Guinea (READ PNG) 35
9. Rwanda Literacy Boost 36

10. Tonga Pacific Early Age Readiness and Learning Program (PEARL) 36
11. Other Evaluations 37
12. Discussion of Evaluation Findings 38
VI. Scope of Investment in Early Grade Reading 40
1. World Bank 41
2. Global Partnership for Education 42
3. United States Agency for International Development 42
4. Key Findings 43
VII. Recommendations and Conclusion 43
1. Increase Investment in Early Grade Reading Interventions 43
2. Foster Commitment from Bilateral Development Agencies and Large Foundations 44
3. Leverage EGRA as an Accountability Mechanism 45
4. Delivering on Universal Basic Literacy for All Youth 45
Appendices 47
Appendix 1: Components of EGRA and Skills Tested 47
Appendix 2: Summary of Evaluation Methodologies 48
Appendix 3: Summary of Evaluation Results 51

Acronyms

Correct Words per Minute - cwpm
Development Assistance Committee - DAC
Early Grade Reading - EGR
Early Grade Reading Assessment - EGRA
Egypt Girls' Improved Learning Outcomes - GILO
Global Partnership for Education - GPE
Kenya Ministry of Education, Science, and Technology - MoEST
Kenya Primary Math and Reading Initiative - PRIMR
Liberia Early Grade Reading Assessment Plus - EGRA Plus
Liberia Teacher Training Program II - LTTP II
Malawi Teacher Professional Development Support Program - MTPDS
Millennium Development Goals - MDGs
Norwegian Agency for Development Cooperation - NORAD
Official Development Assistance - ODA
Oral Reading Fluency - ORF
Organisation for Economic Cooperation and Development - OECD
Papua New Guinea - PNG
Programme for International Student Assessment - PISA
Reading Education Project for Papua New Guinea - READ PNG
Standard Deviations - SDs
Sustainable Development Goals - SDGs
Tonga Pacific Early Age Readiness and Learning Program - PEARL
United Kingdom Department for International Development - DFID
United Nations Educational, Scientific, and Cultural Organization - UNESCO
United States Agency for International Development - USAID

Executive Summary

Learning to read in early primary school enables children to obtain knowledge and develop advanced skills. Despite progress towards universal primary education, millions of students have failed to learn how to read. This failure has undermined primary school completion and advanced skills' acquisition at successive education levels. In adulthood the negative effects undercut earnings and social outcomes. The pursuit of universal secondary education and universal literacy for youth reflects a contradiction since secondary school access and performance depend on reading.

Investment in reading should commence in early primary school. The private returns to education are 10%. Labor markets increasingly demand advanced skills. Reading is a prerequisite for mathematics, writing, and advanced skills. Neuroscience indicates childhood is the ideal time to learn reading and most reading problems occur during childhood. Intervening in early primary school is more cost-effective than remedial instruction in later grades of school.

Illiteracy is widespread in the developing world. In early primary school huge percentages of students cannot read a single word. Standardized tests show around half of secondary students in middle income countries are functionally illiterate. Despite growing primary enrollment rates, literacy, the most fundamental education goal, has gone largely unattained.

Early grade reading interventions have proven effective among students in developing countries. Such interventions involve six components: simplified instructional content focused on reading, curricula based on cognitive research, training and basic instructional guidelines, instructional support for teachers, instructional and reading materials, and tools for student assessment. Typically, interventions streamline instruction and train teachers how to teach reading.

This report reviews evidence from evaluations that consistently shows early grade reading interventions cost-effectively improving oral reading fluency. In countries with high illiteracy rates, early grade reading interventions represent the best initial step in creating literate populations.

Development actors have sponsored numerous early grade reading programs. The World Bank and the Global Partnership for Education are major supporters, but their funding commitments and number of projects lag behind the United States Agency for International Development.

The World Bank should direct a greater share of investment towards early grade reading, foster deeper commitments by bilateral development agencies and large foundations, and leverage reading assessments for accountability in local schools. No country should expand its post-basic education until achieving universal reading in the early grades. Conditions are conducive for developing countries to take action and accomplish substantial progress. The intervention components are known and proven. The World Bank has the opportunity to seize leadership for early grade reading and partner with developing countries to enable individuals and societies to fulfill their potential.

I. Problem and Motivations

Learning to read in early primary school enables children to obtain knowledge and develop advanced skills. Without the ability to read, children falter in primary school and perform poorly, often struggling to follow written instructions and communicate properly in writing. Ultimately, deficient literacy skills contribute to student dropout from primary school and undermine students' ability to learn more advanced skills and perform well in secondary or tertiary education. The negative effects continue into adulthood with lower wages and diminished quality of life.

In 2000 the Millennium Development Goals (MDGs) established a goal for universal primary education meaning all children would complete primary school by 2015. From 2000 to 2015, the global primary school net enrollment rate increased from 83% to 91% and the share of students in developing countries who completed primary school rose from 77% to 84%.[1] Despite impressive gains, 52 countries achieved universal primary education, while 68 missed the mark and 25 had insufficient data.[2] The completion rates measured efficiency, not education quality. In general, low education quality remained a pervasive problem underlying student dropout, but more importantly compromised performance and attainment of skills in secondary and higher education which eroded earnings and engendered negative social outcomes in adulthood.

In the mid-2000s, the World Bank and United States Agency for International Development (USAID) recognized that even though more children attended school in developing countries, students failed to learn basic reading skills. Therefore, the two organizations called for simple, low-cost measures of reading focused on letter recognition, reading simple words, and comprehension of sentences and short paragraphs. In response, RTI International developed the Early Grade Reading Assessment (EGRA). The application of EGRAs across 50 countries and 70 different languages has shown that early primary school students in developing countries struggle to recognize letters, basic words, and comprehend short paragraphs. EGRAs have become the basis for early grade reading (EGR) interventions in instruction and reading materials that have improved students' ability to read in multiple contexts. Despite progress, significant gaps remain.

In 2015 the United Nations accepted the Sustainable Development Goals (SDGs), which built on the MDGs with a vision for the world in 2030. Among the 17 SDGs, the fourth goal promoted quality education with targets for universal primary and secondary education and universal basic literacy and numeracy for youth. An obvious tension exists between universal secondary education and universal literacy for youth. In particular, large numbers of students fail to learn basic reading that enables them to complete primary school and succeed in secondary school. Recent scores from the Programme for International Student Assessment (PISA) – an international test for mathematics, science and reading that compares competencies across countries – illustrate how nearly half of 15-year-old students in middle income countries are functionally illiterate, while nationally representative EGRA scores signal that large percentages

[1] United Nations, *The Millennium Development Goals Report 2015* (New York, NY: United Nations, 2015), 24, 26.
[2] World Bank, *Global Monitoring Report 2015/2016: Development Goals in an Era of Demographic Change* (Washington, DC: World Bank, 2016), 89.

of primary school students cannot read a word. In short, striving for universal secondary education seems premature given how many students never learn basic reading skills in primary school.

As the following section of this report shows, the case for investing in EGR begins with the need to invest early due to the high returns to primary education, labor markets' increasing demand for advanced skills, the neuroscience of reading, the ages at which children experience reading difficulties, and the cost-effectiveness of intervening in early primary school. However, section III clarifies that PISA results from middle income countries and EGRA metrics from a multiple developing countries reveal children do not learn how to read properly. Fortunately, education specialists are learning more about solutions to deficiencies in EGR. In particular, section IV describes the six elements of EGR interventions: simplified instructional methods, evidence-based reading curricula, teacher training on pedagogical methods for basic reading skills, coaching from instructional assistants to reinforce teaching techniques, provision of appropriate grade-level teaching resources and reading materials, and tools for oral reading assessments. Section V outlines the evidence from evaluations proving EGR programs with these activities yield statistically significant gains in oral reading fluency (ORF). More importantly, the evidence confirms EGR as generally cost-effective. An examination of major EGR donors in section VI demonstrates that the World Bank and the Global Partnership for Education (GPE) have not invested as heavily in EGR interventions as USAID. Section VII concludes by arguing that the World Bank should direct more investment towards EGR, foster greater commitment from bilaterals for EGR, incorporate greater accountability mechanisms into EGR interventions, and encourage partner countries to stop expanding post-basic education until they have attained universal literacy in the early grades.

II. The Importance of Investing Early in Reading

It is paramount to invest in early reading around the ages of five or six. Broadly, private returns to education illustrate that each additional year of schooling has a high rate of return near 10% and primary education has the second highest rate of return at 11.5%. Moreover, the narrow social returns for primary education are highest at 18.9%. Labor markets increasingly demand advanced skills for solving unstructured problems and influencing decisions. Reading remains one of three foundational skills critical to the development of advanced skills and macroeconomic growth. Findings from neuroscience research show that the cognitive processes of reading have a precise sequence in which each step must occur in milliseconds or a person cannot comprehend the text. The ideal time to develop word reading and listening comprehension that leads to reading fluency happens in childhood. In certain languages children can reach this stage by the end of 1st grade. In addition, the typical problems that undermine literacy occur between the ages of 4 and 9. The evidence indicates that primary school interventions are cost-effective given their impacts on reading ability, and also that the costs of addressing reading problems are lower in early primary school compared to upper primary or secondary school. Ultimately, if a child does not learn to read properly in 1st grade, the negative effects cascade and prevent the person from learning more advanced cognitive skills and progressing onto higher levels of education.

1. High Returns to Education

The returns to education are the broadest level of evidence for investing early in education and EGR. The literature on returns to education originated in the 1960s with human capital theory. Jacob Mincer started measuring private returns with an earnings equation that treated the natural log of earnings as a function of years of schooling and potential work experience.[3] Known today as the Mincerian equation, the coefficient for the years of schooling indicates the average return for an additional year of schooling. Over the last 40 years economists have employed the Mincerian equation to determine returns in most countries analyzing time periods from the 1960s until now. Claudio Montenegro and Harry Patrinos conducted a recent survey of private returns to education and identified a global return of 9.7% for each additional year of schooling.[4]

An extended Mincerian equation allows measurement of returns for primary, secondary, and tertiary education. George Psacharopoulos and Harry Patrinos explain that the singular years of schooling variable becomes three dummy variables – one for each level of education – in which each level of education is compared to an omitted comparison group of people without education. Returns for each level of education are computed by taking the coefficients and factoring out foregone years of work due to education.[5] For decades the returns literature found that primary education had the highest private returns of any level of education. However, the general expansion of primary education and labor markets demand for advanced skills changed the relationship between primary and tertiary education. Consequently, Montenegro and Patrinos confirmed tertiary education had the highest global private return at 14.6%, followed by primary at 11.5% and secondary at 6.8%.[6] Overall, the global returns demonstrate the importance of investing in primary education. While the returns are not as high as tertiary education, the returns are still impressive. More importantly, primary education builds foundational skills, such as reading, which people need to progress to higher levels of education and to learn advanced skills.

In addition to private returns, education has narrow and broad social returns that imply earlier investment benefits society. Psacharopoulos and Patrinos state that narrow returns consider the financial costs to society for financing education and the earnings of workers. In contrast, broad social returns attempt to measure and quantify numerous externalities such as health, crime, social safety net usage, and governance.[7] The global narrow social return for primary education is 18.9% with secondary at 13.1% and tertiary at 10.8%.[8] On average narrow social returns are higher for poorer countries. The narrow social rates of return justify public investment into education, especially primary education.

---

[3] Jacob Mincer, *Schooling, Experience, and Earnings* (New York, NY: National Bureau for Economic Research, 1974), 84.

[4] Claudio Montenegro and Harry Patrinos, "Comparable Estimates of Returns to Schooling Around the World," Policy Research Working Paper 7020 (World Bank, 2014), 14.

[5] George Psacharopoulos and Harry Patrinos, "Human Capital and Rates of Return" in *International Handbook on the Economics of Education*, ed. Geraint Johanes and Jill Johanes (Northampton, MA: Edward Elgar, 2004), 8.

[6] Montenegro and Patrinos, "Comparable Estimates of Returns to Schooling Around the World," 12.

[7] Psacharopoulos and Patrinos, "Human Capital and Rates of Return," 5.

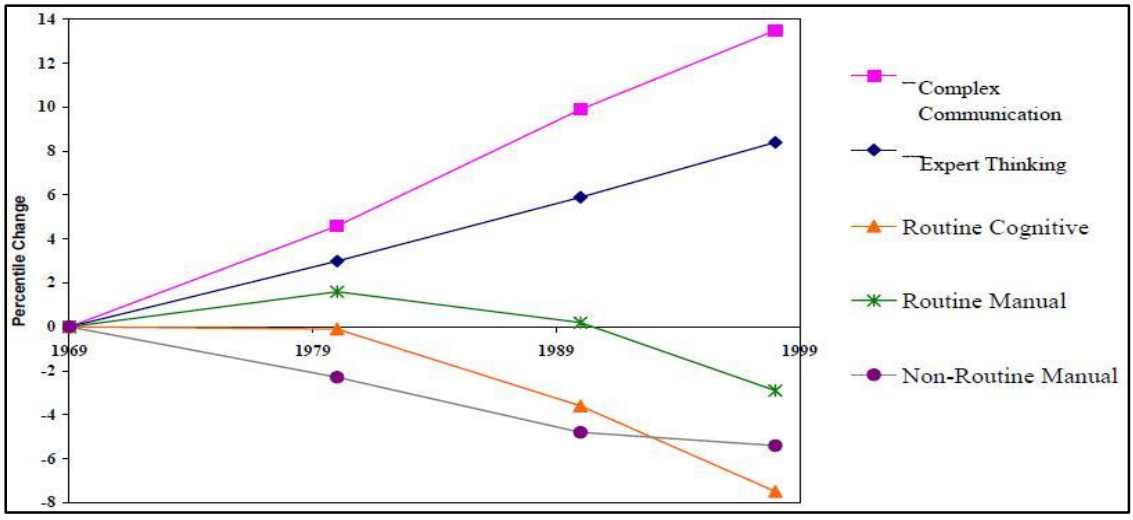
[8] George Psacharopoulos and Harry Patrinos, "Returns to Investment in Education: A Further Update," *Education Economics* 12, no. 2 (2004): 114.

Until recently, the externalities associated with broad social returns were difficult to quantify. The International Commission on Financing Global Education Opportunity examined the question. When the Commission only considered narrow social returns, the return for an additional year of schooling on average in low-income countries was 10% and 7% in lower-middle income countries. After factoring in health improvements attributable to education, specifically declines in child mortality and adult mortality due to girls education, the Commission found that the cost benefit ratio doubled in low-income countries and increased by 33% in lower-middle income countries.[9] The Commission's findings demonstrate that wider social benefits, while difficult to calculate, are high even when analyzing one type of benefits.

2. Increasing Demand for Advanced Skills

The demand for higher order skills has been increasing for decades. Frank Levy and Richard Murnane argue that computerization and globalization have driven labor markets to highly value advanced skills. Specifically, expert thinking – the ability to solve unstructured problems – and complex communication – the ability to acquire information through interpersonal interaction and influence decisions – are the most sought after advanced skills. As Figure 1 shows, the demand for the two skills has increased nearly eight percentage points and 14 percentage points respectively since 1969. In contrast, the demand for moderate and basic job skills has declined three to eight percentage points, largely because firms have automated or outsourced routine job functions. The increasing demand for advanced skills will continue with sustained trends in automation and outsourcing.[10]

Figure 1: Percentile Change in Demand for Skills [11]



[9] International Commission on Financing Global Education Opportunity, *The Learning Generation: Investing in Education for a Changing World* (New York, NY: Education Commission, 2016), 34-35.
[10] Frank Levy and Richard Murnane, "How Computerized Work and Globalization Shape Human Skill Demands," Massachusetts Institute of Technology Industrial Performance Center Working Paper Series 05-006 (Massachusetts Institute of Technology, 2005), 14-16.
[11] Ibid., 15.

Recent research confirms the findings on advanced skills and trends about automation. The World Bank's analysis demonstrates that since 2000 the share of employment that depends on advanced skills has increased in both high income and developing countries, while the share of employment for lower skills has declined.[12] The International Commission on Financing Global Education Opportunity warns that half of the current jobs in the world are vulnerable to automation by 2030. Automation will drive increased demand for advanced skills and depress the demand for lower skilled employees. The people with advanced skills will benefit with greater earnings, but the people in developing countries with lower skill sets will receive lower wages and contend with higher degrees of unemployment.[13] Basic skills learned in primary school form the foundation of advanced skills.

Without basic skills, a person cannot progress through the levels of education and obtain advanced skills that command a wage premium on labor markets. Levy and Murnane claim that expert thinking and complex communication are based in reading, writing, and mathematics. In particular, reading enables people to learn new information and it facilitates processing ideas and concepts in one's daily environment. In times of economic distress, reading becomes fundamental for gathering information and making adjustments to overcome adversities. Similar to the increasing demand for advanced skills, the twin phenomena of automation and outsourcing will continue to drive demand for reading skills that sustain advanced skills and numerous job functions.[14] The value of reading skills also has implications for economic growth.

Shortcomings in reading constrain economic growth because a country's labor force lacks skills to harness technology and enhance productivity. Richard Easterlin found that the degree to which an economy adopts new technology and grows hinges on its labor force's formal schooling. Gains in schooling facilitate the adoption of new technology which leads to growth. Primary education forms the foundation for economic growth.[15] Costas Azariadis and Allan Drazen specified that differences in human capital account for variations in economic growth rates among countries. The human capital stock must accumulate to a particular level in order for economic growth. They attributed the threshold effect to the social returns of education. Their research correlated literacy with economic growth. A country does not grow without an educated labor force and a more highly educated labor force is associated with greater economic growth.[16] Eric Hanushek and Ludger Woessmann concluded that variations in cognitive skills of mathematics and science account for differences in long run economic growth, however, their robustness checks found significant results even when scrutinizing only reading.[17] Clearly, the accumulated research establishes reading skills as foundational for the personal development of advanced skills and productive workforces that sustain macroeconomic growth.

---

[12] World Bank, *World Development Report 2016: Digital Dividends* (Washington, DC: World Bank, 2016), 124.
[13] International Commission on Financing Global Education Opportunity, *The Learning Generation*, 30-31.
[14] Levy and Murnane, "How Computerized Work and Globalization Shape Human Skill Demands," 18-19.
[15] Richard Easterlin, "Why Isn't the Whole World Developed," *Journal of Economic History* 41, no. 1 (1981): 6, 10.
[16] Costas Azariadis and Allan Drazen, "Threshold Externalities in Economic Development," *Quarterly Journal of Economics* 105, no. 2 (1990): 505-508, 519-521.
[17] Eric Hanushek and Ludger Woessmann, *The Knowledge Capital of Nations: Education and the Economics of Growth* (Cambridge, MA: MIT Press, 2015), 42-43, 52-53.

3. Neuroscience of Literacy Development

The ability to read relies on a precise sequence of cognitive skills during which each step must occur automatically so that the student comprehends the meaning of the passage. A breakdown at any point in the process inhibits reading comprehension. This concept is illustrated in Figure 2. Young-Suk Kim, Helen Boyle, Stephanie Zuilkowski, and Pooja Nakamura explain that reading comprehension requires word reading and listening comprehension. Word reading requires knowledge of sounds, writing systems, and meanings of words. Emergent literacy skills bolster knowledge in each of these areas. For sounds a child needs phonological awareness, writing systems demand print awareness and orthographic awareness, and meaning relies on morphological awareness. Listening comprehension does not happen without cognitive skills in working memory, inhibitory control, attentional control, and knowledge of vocabulary and grammar. Essentially, reading fluency happens when word reading and listening comprehension function seamlessly. Once a child achieves reading fluency, he can comprehend a paragraph or longer text.[18] Deficiencies in emergent literacy skills or cognitive skills as well as an inability to master word reading and listening comprehension prevent a child from becoming fully literate.

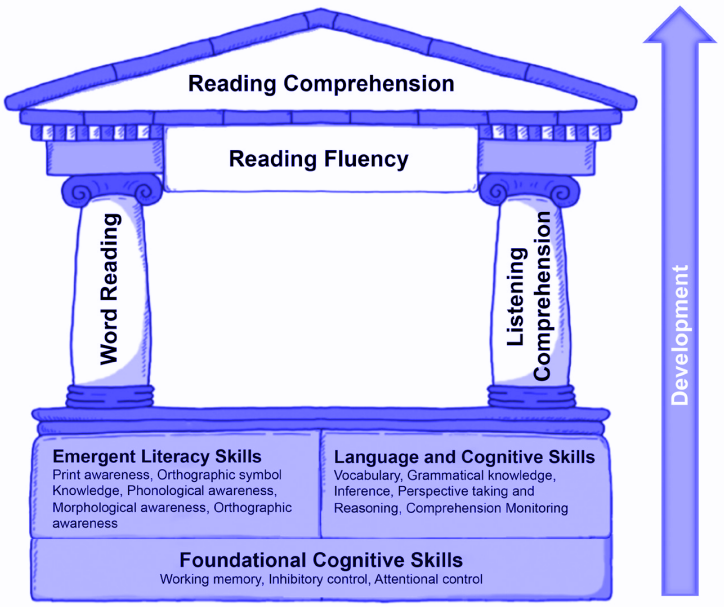
Of the different skills and abilities that comprise literacy development, students should attain reading fluency quickly in early grades with the proper resources and instruction. Helen Abadzi contends that after 100 days of practice in 1st grade a child reaches reading fluency in languages that are consistently spelled and pronounced, which does not include English or French.[19] Abadzi points out that the initial process is slow as a child learns to recognize letters and associate them with sounds. Eventually the student recognizes groupings of four or five letters allowing the person to read more text. After attaining reading fluency a child understands text seamlessly and begins to focus on the meaning of the words and sentences. However, to reach reading fluency, a child must learn the letters, associated sounds, and diligently practice reading with proper materials. Due to constraints of brain development, childhood is the optimal time to learn letters and sounds because the ability to master letters and attain reading fluency diminishes after childhood.[20] The ideal ages to learn reading are five or six years old.

[18] Young-Suk Grace Kim, Helen Boyle, Stephanie Zuilkowski, and Pooja Nakamura, *Landscape Report on Early Grade Literacy* (Washington, DC: USAID, 2016), 8-9.

[19] Helen Abadzi, "Literacy for All in 100 Days? A Research-Based Strategy for Fast Progress in Low-Income Countries," Global Partnership for Education Working Paper Series on Learning No. 7 (Global Partnership for Education, 2013), 2.

[20] Helen Abadzi, "Turning a Molehill into a Mountain? Why Reading Curricula Are Failing the Poor Worldwide," (article accepted for publication, 2016), 8.

Figure 2: Skills and Abilities of Literacy Development [21]



4. Impediments to Literacy Development in Early Childhood

Research demonstrates that a child's ability to read has roots in experiences long before any education and the experiences have lasting impacts. During the late 1980s, Susan Walker conducted an experiment in Jamaica that examined the role of nutrition and mental stimulation on outcomes in childhood and adolescence. Stunted participants ranging in ages from nine to 24 months were divided between treatment and control groups. The treatment groups of stunted children received supplemental feeding, visits from community health workers to instruct parents in play interactions, or both interventions for nutrition and mental stimulation. A follow up on the children in their teenage years found that children who had received mental stimulation scored better on reading tests that measured sentence completion and context comprehension. The supplemental nutrition had no measurable impact on reading.[22] Unfortunately, an earlier follow up on participants, when they were 11 and 12 years old during primary school, did not specifically assess their reading ability, but found children who received mental stimulation performed better on vocabulary assessments.[23] Paul Gertler studied the participants 20 years after the program to determine their earnings. As adults in their early twenties, the children from the mental stimulation treatment had 25% higher earnings for full-time work than the control group. Comparing the treatment group to a non-stunted comparison group uncovered that the stunted and non-stunted groups did not earn statistically different wages. The results substantiated that

[21] Ibid., 9.

[22] Susan Walker, Susan Chang, Christine Powell, and Sally Grantham-McGregor, "Effects of Early Childhood Psychosocial Stimulation and Nutritional Supplementation on Cognition and Education in Growth-Stunted Jamaican Children: Prospective Cohort Study," *Lancet* 366, no. 9499 (2005): 1805.

[23] Susan Walker, Susan Chang, Christine Powell, and Sally Grantham-McGregor, "Effects of Growth Restriction in Early Childhood on Growth, IQ, and Cognition at Age 11 to 12 Years and the Benefits of Nutritional Supplementation and Psychosocial Stimulation," *Journal of Pediatrics* 137, no. 1 (2000): 39.

the mental stimulation activities had a long-term effect on earnings and facilitated the participants to overcome developmental delays.[24] The early childhood studies in Jamaica confirm that mental stimulation during the first two years of life meaningfully influences how well a child learns to read in primary school and earnings in early adulthood.

Nonetheless, the most immediate issues concerning literacy emerge slightly before primary school and during early primary school. Luis Crouch and Katherine Merseth characterize this time period as the first five: the two years before primary school and then the first three years of primary school.[25] Often children in developing countries cannot attend pre-primary school, a situation that undermines their readiness to learn how to read in early primary school. Sophie Naudeau, Sebastian Martinez, Patrick Premand, and Deon Filmer assert that children with cognitive delays are more common in developing countries, less likely to attend primary school on-time, and typically have lower academic achievement. Mental stimulation before the age of five is critical for the proper development for brain synapses necessary for various cognitive skills and emotional functions. Remedying delays in cognitive development from deficient mental stimulation at these ages has limitations.[26] Therefore, children with delays establish a weak foundation from which to learn in primary school.

The fallout from the lack of pre-primary education in developing countries impacts primary school achievement in reading. Crouch and Merseth found that when children enroll in 1st grade there are many overage and underage students. They discovered 39 countries with over-enrollment of 30% or greater relative to age in 1st grade because of students who enrolled early and a large number of students who were repeating the grade largely unacknowledged by ministries of education. The phenomenon known as churn means students remain in 1st grade for two years before proceeding to 2nd grade where repetition happens again. The consequences of churn on literacy are disastrous: half the children in 2nd grade cannot read a word.[27] The lack of primary school readiness and low quality learning environments often inhibit the development of reading skills.

5. Cost-Effectiveness of Early Investment

There are immense costs to an individual and society associated with illiteracy. The Every Child a Chance Trust analyzed the costs of illiteracy in the context of the United Kingdom. Broadly, there are higher costs associated with employment, education, crime, and health. Employment costs were the largest and attributed to lower tax revenues and greater strain on unemployment benefits. The education costs were also substantial, mainly composed of extra instruction for

[24] Paul Gertler, James Heckman, Rodrigo Pinto, Arianna Zanolini, Christel Vermeersch, Susan Walker, Susan Chang, and Sally Grantham-McGregor, "Labor Market Returns to Early Childhood Stimulation Intervention in Jamaica," *Science* 344, no. 6187 (2014): 1000-1001.

[25] Luis Crouch and Katherine Merseth, "Stumbling at the First Step: Efficiency Implications of Poor Performance in the Foundational First Five Years," (article accepted for publication, 2016), 2.

[26] Sophie Naudeau, Sebastian Martinez, Patrick Premand, and Deon Filmer, "Cognitive Development Among Young Children in Low-Income Countries," in *No Small Matter: The Impact of Poverty, Shocks, and Human Capital Investments in Early Childhood Development*, ed. Harold Alderman (Washington, DC: World Bank, 2011), 12-14.

[27] Crouch and Merseth, "Stumbling at the First Step," 4-6, 11.

students at the primary and secondary levels. The costs in secondary school outstripped those in primary school. Crime costs were the demands on the criminal justice system, social costs included estimates for substance abuse and teenage pregnancy, and health costs were allocated to depression and obesity.[28] The study's results argue for the cost-effectiveness of early primary school interventions that assist children to learn reading skills.

Certainly, investing early in reading is crucial to efficiently and cost-effectively achieve widespread literacy. The early attainment of literacy permits individuals and societies to capitalize on returns to education, increasing demand for advanced skills, and opportunities for macroeconomic growth. In other words, early investment in reading is a key component in broad-based development. However, the next section highlights how illiteracy abounds in developing countries which thwarts the reading's benefits and impedes the growth of other basic and advanced skills vital to individuals and society.

III. Pervasive Illiteracy in Developing Countries

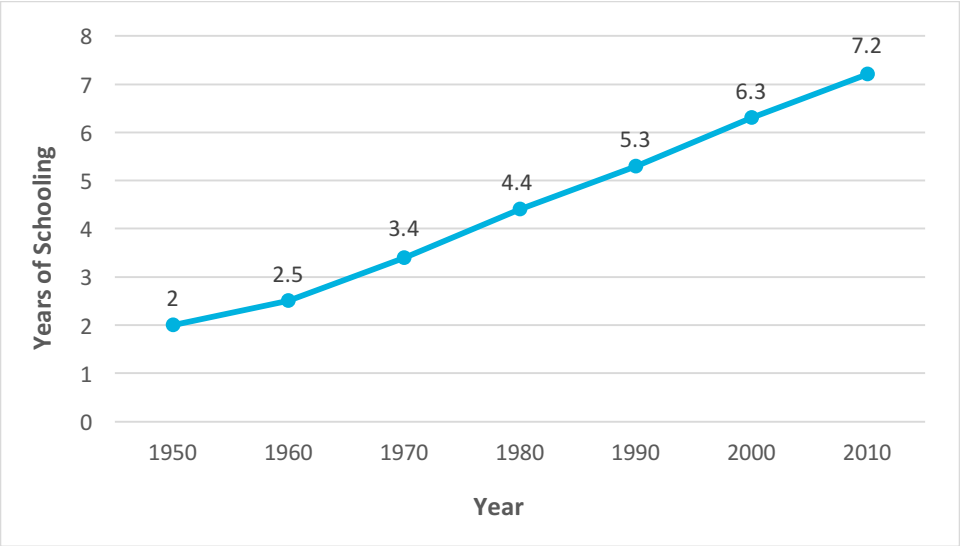
Illiteracy is widespread in the developing world. In the early years of primary school, huge percentages of students often cannot read even a single word. Even after completing primary school, massive numbers of students around the age of 15 are still functionally illiterate. What is more, this prevalence of illiteracy has stubbornly remained more or less constant despite growing rates of enrollment. This means that major strides have been made in reaching certain education access goals, but that literacy, one of the most fundamental and crucial goals of education, has been overlooked and largely unattained.

1. Increasing Rates of School Attendance

Over the past few decades, the average years of schooling has increased dramatically worldwide. In 1950, under half of the world's population over the age of 15 had any formal education at all; today 86% have received formal education.[29] As Figure 3 shows, the amount of schooling completed by the average adult in developing countries increased from two years in 1950 to 7.2 years in 2010. Remarkably, the average Haitian today receives more years of schooling than the average Frenchman did in 1960.[30]

[28] Jean Gross, *The Long Term Costs of Literacy Difficulties* (London: Every Child a Chance Trust, 2009), 6.
[29] Robert Barro and Jong-Wha Lee, "Barro-Lee Educational Attainment Dataset," last modified February 2016, http://www.barrolee.com.
[30] Lant Pritchett, *The Rebirth of Education: Schooling Ain't Learning* (Washington, DC: Center for Global Development, 2013), 16.

Figure 3: Years of Schooling Completed by the Average Adult in the Developing World[31]



In recent years, there has been an even stronger push for increasing rates of schooling. The second MDG targeted universal primary education and it was accompanied by an increase in spending geared towards increasing enrollment. From 2002 to 2013, although spending on education as a percentage of official development assistance (ODA) remained more or less constant, total disbursements to education increased from under $7 billion to over $14 billion.[32] Furthermore, government expenditure on education increased dramatically in most developing countries.[33] Although the goal was not met by all countries, there was major progress in terms of average years of schooling across the developing world. From 2000 to 2015, the global primary school net enrollment rate increased from 83% to 91%.[34] From 1999 to 2008, out of school children declined by half in South and West Asia and one-third in Sub-Saharan Africa. During the same period, an additional 52 million children enrolled in primary school worldwide.[35]

Despite the astounding achievements in school enrollment that have occurred throughout the world in recent years, the quality of education remains low. In fact, the attainment of literacy is still an elusive goal for millions of people, even among those who have completed primary school. Following a discussion on how to best measure literacy, the next part of this section will highlight the prevalence of illiteracy alongside high enrollment rates.

---

[31] Ibid.

[32] Global Campaign for Education, *Education Aid Watch 2015* (Johannesburg, ZA: Global Campaign for Education, 2015), 6.

[33] Nicholas Burnett and Colin Felsman, *Post-2015 Education MDGs* (London, UK: Overseas Development Institute, 2012), 5.

[34] United Nations, *The Millennium Development Goals Report 2015*, 24.

[35] Burnett and Felsman, *Post-2015 Education MDGs*, 4.

2. Approaches to Determining Literacy Rates

There are a number of ways to examine the prevalence of childhood illiteracy. Literacy rates among early grade students allow one to see how students perform during the early years of schooling when investment is so crucial. Meanwhile, literacy rates among students nearing the end of compulsory schooling provide a picture of how many students are illiterate after completing primary school. The section will use both approaches.

Test scores from nationally representative samples, regionally representative samples, or unrepresentative samples from impact evaluations offer another way to inspect literacy. This section will only use nationally and regionally representative samples in order to provide the least biased depiction of the state of illiteracy as possible.

In examining literacy rates there are data on test scores conducted either in local languages or in non-native languages like English or French. When instruction occurs in local languages, it is more likely that the students take the test in their native language, such that the test will more accurately measure pure reading ability as opposed to reading ability in combination with foreign language abilities. For that reason, this section will only present literacy rates for tests conducted in local languages.

Finally, there are a number of different indicators used to determine literacy rates. One of the most basic is ORF which comes from EGRA. PISA test scores are another useful measure. Probably the most widely available indicator is the literacy rate produced by United Nations Educational, Scientific, and Cultural Organization (UNESCO) for a variety of age groups. While the measure is available for almost any country, it measures *self-reported* literacy, rendering it highly subjective and unreliable across contexts. Furthermore, a comparison of these rates to objectively tested literacy rates reveals major discrepancies. As just one example, the projected self-reported literacy rate for Algeria in 2015 was 80%;[36] according to PISA it was 21% in 2016.[37] As a result, this section will not use the UNESCO literacy rates. The EGRA and PISA measures are not the only rigorous literacy measures available, but they are among the most comprehensive and easy to understand. As such, this section will draw from these two measures.

As a final note on examining illiteracy, frequently a given country only has one available source of information. Representative samples are not always available making it impossible to compare literacy rates for early grade students and older students. The lack of data means there is not always a choice for an indicator to use. As a result, missing data impairs comparisons of literacy rates across countries. Despite the limitations for comparability, the extant literacy rates are useful because they highlight the general extent of illiteracy.

---

[36] UNESCO Institute for Statistics, *Adult and Youth Literacy: National, Regional, and Global Trends, 1985-2015* (Montreal, QC: UNESCO, 2013), 37

[37] "Programme for International Student Assessment: Data," *OECD*, last accessed January 2016, http://www.oecd.org/pisa/data.

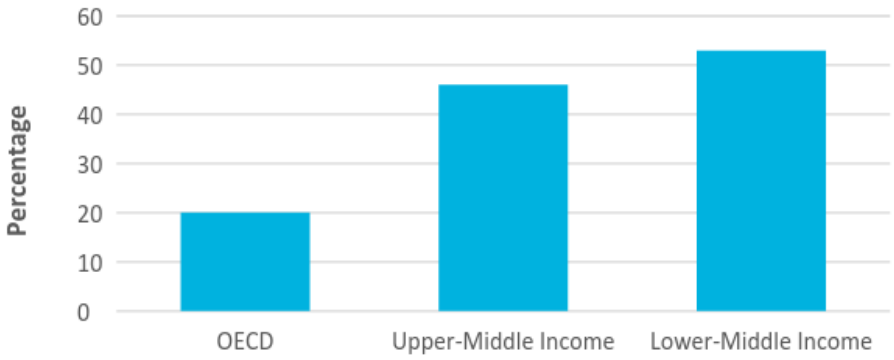
3. Analysis of PISA Results

The OECD conducts PISA every three years to test the knowledge of 15-year-old students in a variety of countries around the world. It is always conducted in the local language and adjusted for the local context.[38] Beginning in 2000, PISA tests students on reading, math, science, financial literacy, and problem solving. This report will examine reading results for 2015, the most recent year of testing. All PISA-related data in this report are taken from the PISA website.[39] PISA surveys are all nationally representative.[40] While all OECD countries take part in PISA, no low-income countries as defined by the World Bank participate in the assessment.

The best way to determine literacy rates using PISA is to investigate the percentage of students scoring below level two. Students can score into six levels, where a higher level indicates stronger reading ability. Students that score into level two can comprehend text in a meaningful way.[41] According to PISA, scoring below level two constitutes a failure to achieve a "baseline level of proficiency in reading."[42] Essentially, reaching level two means students extract the main idea from a text, such that students below level two are functionally illiterate. To be clear, many of these students read to some extent, but they certainly do not have the ORF or reading comprehension skills to meet the rising demand for advanced skills.

A useful starting point when analyzing PISA data is the OECD average for the percentage of students that failed to achieve functional literacy: 20%. The average for middle income countries is much higher at 47%. To break that number down further, the average for upper-middle income countries is 46% and the average for lower-middle income countries is 53%. These numbers are illustrated in Figure 4. The data include all PISA participating countries.

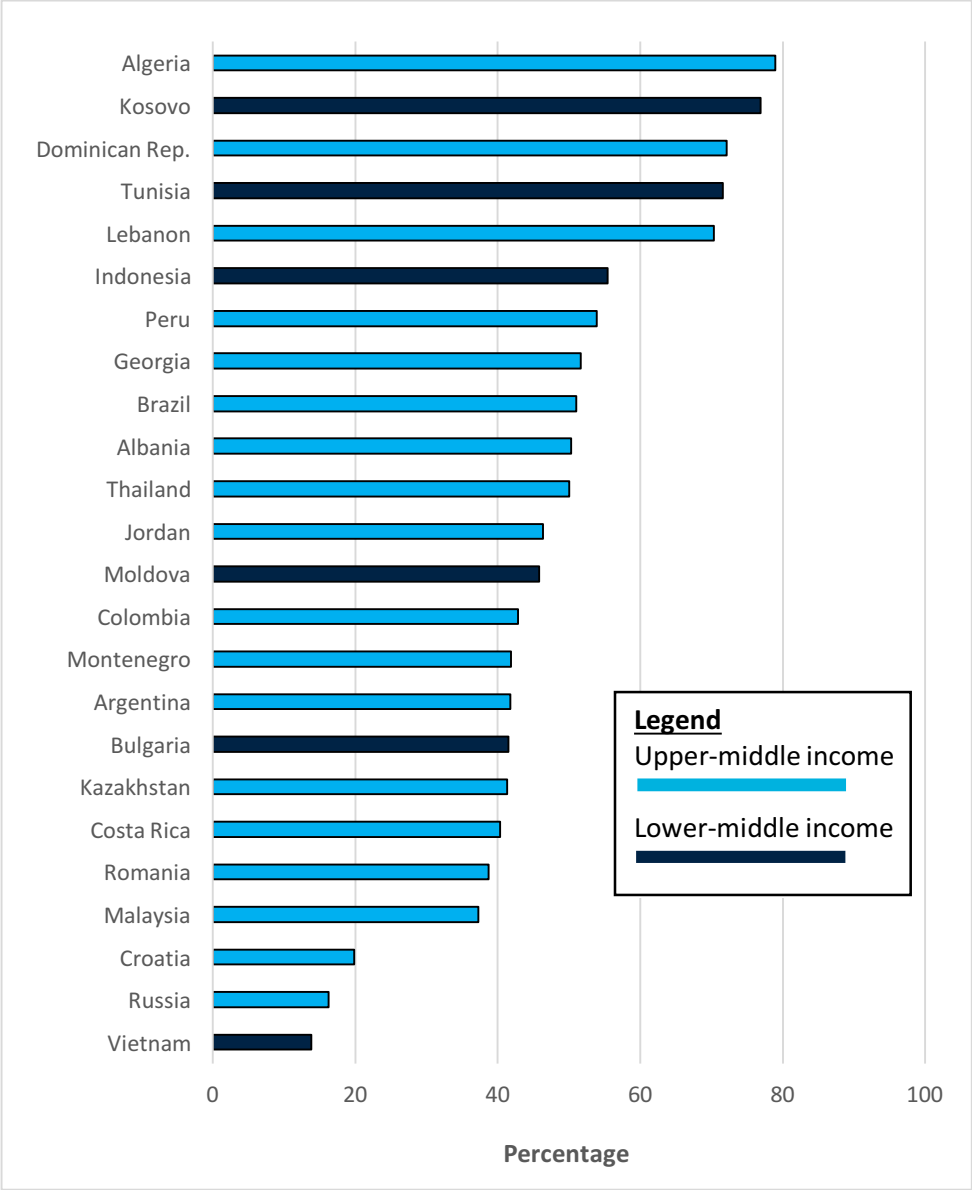
Figure 4: Average Percentage of Functionally Illiterate 15-Year-Olds



[38] Programme for International Student Assessment, *2015 Technical Report: Chapter 5* (Paris, FR: OECD Publishing, 2015), 1.
[39] OECD, *PISA 2015 Assessment and Analytical Framework* (Paris, FR: OECD Publishing, 2016).
[40] Programme for International Student Assessment, *2015 Technical Report: Chapter 4* (Paris, FR: OECD Publishing, 2015), 2.
[41] OECD, *PISA 2015 Assessment and Analytical Framework*, 59.
[42] Ibid.

Figure 5 shows the functional illiteracy rate for all of the middle income countries included in the PISA survey. It also distinguishes between lower- and upper-middle income countries. First of all, the figure displays the severity of illiteracy in some middle income countries. In Algeria, for example, 79% of students tested as illiterate. In addition, the results vary considerably across countries in similar income groups. Russia, Vietnam, and Croatia are all below the OECD average of 20%, whereas the Dominican Republic, Algeria, Kosovo, Tunisia, and Lebanon are all above 70%. Furthermore, no discernable pattern exists for upper-middle income countries performing better than lower-middle income countries. Literacy rates are not a function of a country's GDP per capita.

Figure 5: Average Percentage of Functionally Illiterate 15-Year-Olds in Middle Income Countries



PISA literacy rates only include 15-year-olds still attending school. Although many of the countries survey have compulsory education policies for 15-year-olds, many students cease to attend school by that age. In fact, on average the PISA sample in middle income countries does not cover an estimated 22% of 15-year-olds. Intuitively, students not in attending school are more likely to be illiterate than those students in school. As a result, it is likely that the actual illiteracy rates for this age group are significantly higher than PISA reports.

4. Analysis of EGRA Results

EGRA is a tool used to assess levels of literacy for students in primary schools, usually in 1st, 2nd, and 3rd grade. Appendix 1 details the eight EGRA components, the reading skills associated with each one, and how enumerators test and measure each skill. In this section, results will focus on 2nd and 3rd grade results, which, unlike 1st grade results, represent students' abilities following some years of schooling. All EGRA data in this section were taken in the past ten years. Unlike PISA, EGRA is not a centralized test, but rather a tool employed by various governments or organizations to sample literacy skills in various settings. Therefore, in addition to data from nationally representative samples, some data draws from regionally representative samples.

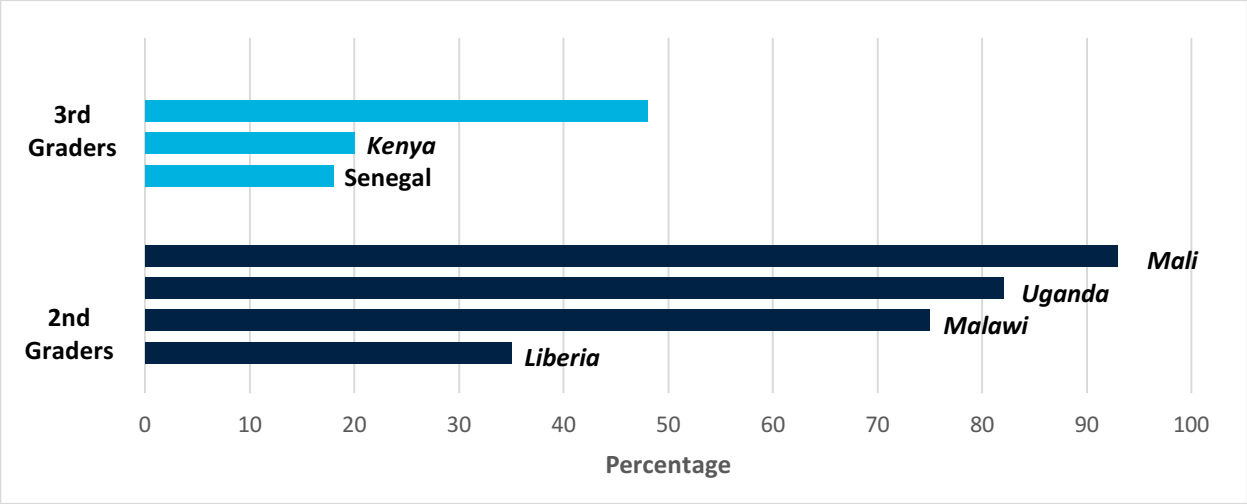
The two main EGRA-based indicators used to measure literacy in this section derive from the ORF component of the test. For this component, students read a passage and enumerators record the number of words that students correctly read per minute meaning results are measured in terms of correct words per minute (cwpm). One indicator related to the ORF component is the percent of zero scores, which indicates the percentage of students that could not read a single world correctly during the ORF test. Another indicator used is the percent of fluent readers. Fluency means that a student can read a benchmarked number of words per minute, a strong indicator for ability to process and comprehend text. The number of words per minute that a student must read in order to reach fluency is not constant across languages, but usually the benchmark ranges between 45 and 60 words per minute.[43]

Figure 6 shows the percentage of 2nd and 3rd graders that cannot read a single word in select countries.[44] In some countries, such as Mali, almost none of the 2nd graders could read a word. In Malawi and Uganda, rates are not much higher, as almost 80% of 2nd graders could not read a single word in those countries. Scores seem a bit higher on average for 3rd graders, which indicates that some learning takes place, but the shares of students that cannot read anything at all are abysmally high. In Haiti almost 50% of 3rd graders could not read a single word.

[43] Helen Abadzi, *Efficient Learning for the Poor: Insights from the Frontier of Cognitive Neuroscience*, (Washington, DC: World Bank, 2012), 37.

[44] Amber Gove and Peter Cvelich, *Early Reading: Igniting Education for All: A report by the Early Grade Learning Community of Practice* (Research Triangle Park, NC: Research Triangle Institute, 2010), 11.

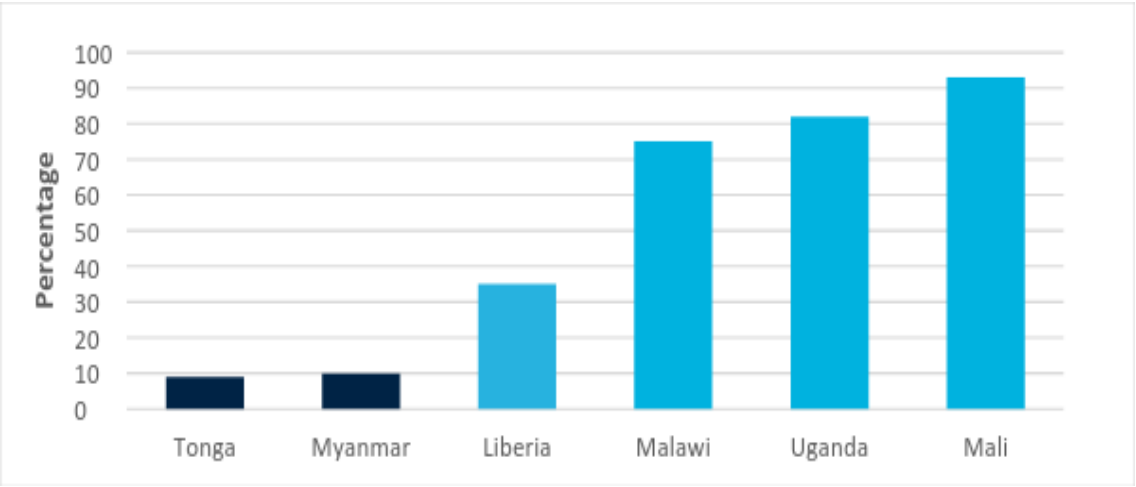
Figure 6: Percentage of 2nd and 3rd Graders That Cannot Read a Single Word*



*Scores are taken from nationally and regionally representative EGRA samples from 2008 and later

Figure 7 incorporates scores from several higher-performing countries, Tonga[45] and Myanmar[46], where only 10% of 2nd graders read zero words. Notwithstanding, the zero-reading indicator represents a very low bar of achievement. To put this into perspective, 70% of 2nd graders in Tonga, which had the lowest rate of zero-word readers, could not read with fluency.[47] In other words, about 70% of students could not comprehend the text. Thus, even the countries that seem to perform the best by this measure have very low reading abilities in the early grades.

Figure 7: Percentage of 2nd Grades That Cannot Read a Single Word*



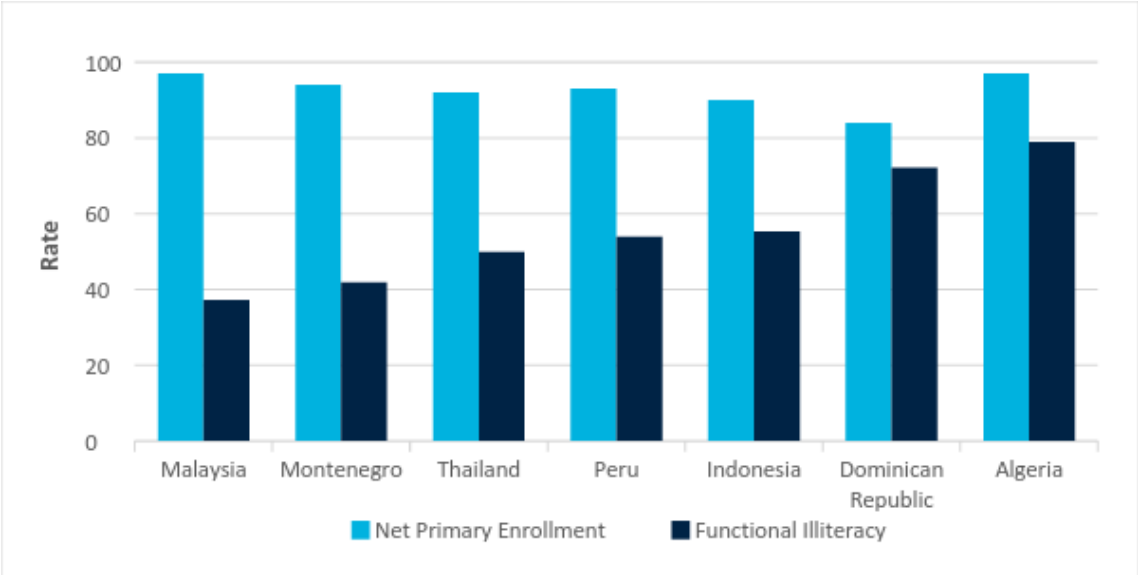
*Scores are taken from nationally and regionally representative EGRA samples from 2008 and later

[45] World Bank, *Tonga Early Grade Reading (TEGRA) Baseline Survey* (Washington, DC: World Bank, 2012), 23.
[46] World Bank, *Myanmar Early Grade Reading Assessment for the Yangon Region* (Washington, DC: World Bank, 2015), 28.
[47] World Bank, *Tonga Early Grade Reading (TEGRA) Baseline Survey*, 23.

5. Schooled and Illiterate

Turning back to enrollment rates, high levels of enrollment do not necessarily coincide with quality education. In Uganda, for example, the net enrollment rate for primary school grew from 57% in 1986 to 93% in 2009.[48] However, a 2009 regionally-representative sample found that 82% of 2nd graders could not read a single word in the local language of instruction. In Algeria, even though nearly all primary-school aged students enrolled in school, PISA scores show that 79% of 15-year-olds were functionally illiterate. As Figure 8 shows, high enrollment rates alongside low literacy rates are a common trend.

Figure 8: Comparison of Illiteracy Rates Among 15-Year-Olds and Primary Net Enrollment Rates



* Each country's enrollment rate is for the most recent year for which there is data, ranging from 2011 to 2014.

As all of the above information shows, unacceptably high illiteracy rates persist despite high primary school enrollment rates. If literacy rates had at least improved in tandem with enrollment rates, education specialists would have reason for optimism. However, PISA scores disabuse any reason for optimism. Figure 9 portrays the changes in average PISA scores, from 2006 to 2015, for all middle income countries that participated in the test since 2006. Except for a few countries, scores have either decreased or stagnated. In the figure, stagnation is set arbitrarily for countries that have failed to achieve at least a 15-point increase. To put that number in context, the lowest level of achievement, level 1, starts at 335 points, and the highest score level starts at 625 points.

[48] "Net enrollment rate, primary, both sexes (%)," *World Bank*, accessed February 2017, http://data.worldbank.org/indicator/SE.PRM.NENR?end=2009&locations=UG&start=1986.

Figure 9: Comparison of Lower-Middle Income Country PISA Scores in Reading

Country	2006 PISA reading score	2015 PISA reading score
Brazil	393	407
Bulgaria	402	432
Colombia	385	425
Croatia	477	487
Indonesia	393	397
Jordan	401	408
Romania	396	434
Russia	440	495
Thailand	417	409
Tunisia	380	361

LEGEND
Stagnant
Decrease

The findings from this section expose the illiteracy's persistence in developing countries despite generally high and increasing enrollment rates. In countries like Malawi, Mali, and Uganda, the vast majority of 2nd graders cannot read a single word. If after two years of school students are still completely illiterate, then what are they learning?

Clearly, many education systems are failing to educate a vast portion of their students. As a result, illiteracy, at least at a functional level, sustains all the way through primary school and beyond. In countries like Algeria, Kosovo, the Dominican Republic, Tunisia, and Lebanon, the majority of children preparing to leave primary school still cannot comprehend the main message of basic texts. How are these children going to succeed in economies with rising demands for high-level skills? And how are these countries supposed to experience broad-based development if half their populations remain functionally illiterate?

Obviously, the problem demands an intervention in many countries at an early age that prevents the vicious circle of low learning outcomes. Although there is some cross-national variation, illiteracy pervades as a pandemic in the bulk of developing countries.

IV. A Solution for Mitigating Illiteracy

The first two sections presented a bleak narrative. Learning to read in early primary school is crucial for obtaining other basic skills and advanced skills which are increasingly demanded by labor markets and key for economic growth. Unfortunately, massive swaths of populations in developing countries remain illiterate even though primary school enrollments have expanded substantially. This section along with the following section will describe EGR interventions and their potential as the best first step to alleviate illiteracy in developing countries.

So what exactly are these EGR interventions that have the potential to change the course of students' learning across the developing world? The answer is simple. EGR interventions involve training teachers how to teach literacy and giving them the tools to accomplish the goal.

At first glance, this solution may appear so simple and intuitive that it seems obvious. Yet the research on EGR interventions is far from simple, and there is a great deal of nuance to the components that constitute these interventions.

EGR interventions involve a number of core components, including:

- Simplifying the content of instruction to focus on the basics
- Employing curricula for teaching reading based on cognitive development research
- Providing training and basic instructional guidelines
- Offering follow-up support for teachers
- Supplying supplementary instructional materials
- Administering training and tools for student assessment

Every EGR intervention does not adopt all six elements and some interventions include additional components. Nevertheless, every EGR intervention involves focused teacher training that expands teachers' abilities to specifically teach reading. The other elements build on that core component. The remainder of this section explains and justifies the importance of each element. The next section explores the evidence of impact and cost-effectiveness.

1. Simplifying Instruction

First and foremost, strong EGR interventions require focusing instruction on the basics of literacy. When curricula and learning goals outpace student abilities, learning outcomes tend to be lower.[49] And even when activities concentrate on reading, if learning objectives are not based in the reality of students' abilities, then instruction tends to become less effective. All too often, approaches to teaching literacy have their basis in curricula formulated in developed countries. Transplanting these curricula to developing countries sets unrealistically high expectations that undermine education quality.[50] Currently, a multitude of curricula are based on overreaching expectations.[51] By utilizing instructional materials and curricula based on students' levels of attainment and literacy, EGR interventions are much more effective at teaching students to read.[52]

2. Using Evidence-Based Curricula

Related to matching instruction to ability, effective EGR interventions also train teachers to teach reading in ways that are based on evidence from cognitive research. This research shows that

---

[49] Lant Pritchett and Amanda Beatty, "Slow Down, You're Going Too Fast: Matching Curricula to Student Skill Levels," *International Journal of Educational Development* 40 (2015): 276-288.

[50] Helen Abadzi, "Turning a Molehill into a Mountain?," 2-3.

[51] ASER Centre, *Annual Status of Education Report 2010* (Mumbai, IN: Pratham Resource Center, 2011), 6.

[52] Kim, Boyle, Zuilkowski, and Nakamura, *Landscape Report on Early Grade Literacy*, 9-12.

learning to read takes place through a strict sequence, where one skill builds on another.[53] If this sequence is not followed, literacy acquisition can take much longer, or not occur at all. The literature also shows that the sequence is not necessarily intuitive or the same for all languages.[54] Likewise, the best way to teach literacy depends on the amount of time and resources available.[55] However, curricula in developing countries are often based on curricula developed for western languages and contexts, regardless of their suitability. On top of that, many teachers in developing countries are undereducated and do not receive clear instruction on how to teach literacy. As a result, literacy instruction is often highly ineffective.[56]

There are several implications from these findings. For one, many externally funded attempts at improving literacy have failed, as they assumed children learn to read the same way in all languages and in all contexts. It is also no surprise that children are not learning to read from teachers that have received little training. On the positive side, these findings also suggest that changes to literacy instruction can make a large difference. If teachers learn the correct way to teach children to read, their instruction will become much more effective and students will excel much more easily. For many languages, in fact, both cognitive research and empirical findings show that most 1st grade students should learn to read more or less fluently after 100 days of instruction.[57]

3. Training Teachers and Providing Instructional Guidelines

Many teachers in developing countries have little to no training in teaching literacy, and are often undereducated in general.[58] According to UNESCO, over a quarter of all teachers in developing countries are not trained according to national standard.[59] Given the evidence that reading should be taught in a very specific way, this is an obvious problem. To fill this gap, effective EGR interventions provide capacity development to teachers in multiple ways. First of all, they train teachers. Training should move beyond the large conference-style professional development workshops that are so common in many countries.[60] Such conferences have proven ineffective compared to more personal and extensive trainings.[61] Furthermore, trainings need to focus very specifically on literacy, not general capacity building.

---

[53] Chiara Valeria Marinelli, Marialuisa Martelli, Prachayani Praphamontripong, Pierluigi Zoccolotti, and Helen Abadzi, "Visual and Linguistic Factors in Literacy Acquisition: Instructional Implications for Beginning Readers in Low-Income Countries," GPE Working Paper Series on Learning no. 2 (Global Partnership for Education, 2011), 96-98.

[54] Helen Abadzi, "Literacy for All in 100 Days?," 9-11.

[55] Helen Abadzi, "Turning a Molehill into a Mountain?," 13.

[56] Helen Abadzi, "Literacy for All in 100 Days?," 9.

[57] Ibid., 11-13.

[58] John Pryor, Kwame Akyeampong, Jo Westbrook, and Kattie Lussier, "Rethinking Teacher Preparation and Professional Development in Africa: An Analysis of the Curriculum of Teacher Education in the Teaching of Early Reading and Mathematics," *The Curriculum Journal* 23, no. 4 (2012): 409-502.

[59] Education for All, *EFA Global Monitoring Report 2013/4* (Montreal, QC: UNESCO, 2014), 6.

[60] Helen Abadzi, *Efficient Learning for the Poor*, 127-130.

[61] Thomas Tilson, Augustine Kamlongera, Mateusz Pucilowski, and Dorothy Nampota, *Evaluation of the Malawi Teacher Professional Development Support (MTDPS) Support Program* (Lilongwe, MW: USAID/Malawi, 2013).

Trainings should also match teachers' existing abilities.[62] To do so, where teacher capacities are low, teachers should have clear instructional guidelines. These guidelines should allow teachers to develop simple literacy-instruction routines.[63] The ideal guide should provide step-by-step instructions without too many words or complex procedures.[64] The guidelines may even have interactive content. For an intervention in Jordan, instructional guidelines took the form of videos.[65] The best guidelines should also give scripted lessons for every instructional day of the semester. Regardless of the format, teachers should receive training before implementing them.[66]

4. Following Up With Coaching and Monitoring

To compound the effectiveness of teacher trainings, EGR interventions can provide ongoing monitoring, feedback, and in-classroom coaching to teachers. Such measures ensure that teachers correctly apply what they have learned in training. Typically, teachers struggle to retain and put into practice new knowledge gained from trainings.[67] It is also common for teachers to only partially follow instructional guides.[68] Coaching and continual feedback mollify these problems. Some of the most effective trainings involve modeling from a coach.[69] In general, teachers tend to apply more of what they learned when trainings feature in-classroom coaching and feedback.[70]

5. Providing Supplementary Instructional Materials

It is difficult to teach children to read without basic materials such as books. Ensuring the classrooms have reading materials is a key component in teaching students to read.[71] But the availability of texts in developing country schools is often woefully inadequate.[72] While the provision of materials alone does not transform learning outcomes, reading materials are fundamental for instruction once teachers have training to use them in reading instruction.[73] However, books should cater to the local culture and to the reading levels of the students.[74] In

---

[62] Helen Abadzi, "Literacy for All in 100 Days?," 34-38.
[63] Ibid.
[64] Thomas Tilson, Eric Allemano, Kofi Mereku, and Kofi Marfo, *Evaluation of the USAID-Funded Textbooks and Learning Materials Programs (TLMP) in Ethiopia, Ghana, Malawi, Senegal, South Africa and Tanzania* (Washington, DC: USAID, 2013).
[65] Aamout Brombacher, Jonathan Stern, Lee Nordstrum, Chris Cummiske, and Amy Mulcahy-Dunn, *Education Data for Decision Making (EdData II): National Early Grade Literacy and Numeracy Survey - Jordan, Intervention Impact Analysis Report* (Amman, JO: USAID/Jordan, 2014), 8
[66] Kim, Boyle, Zuilkowski, and Nakamura, *Landscape Report on Early Grade Literacy*, 10-11.
[67] Nancy Clark-Chiarelli and Nathalie Louge, "Teacher Quality as a Mediator of Student Achievement," in *Understanding What Works in Oral Reading Assessments*, (Montreal, QC: UNESCO, 2016), 30-40.
[68] RTI International, *NALAP Formative Evaluation Report, Ghana* (Washington, DC: USAID, 2011), 7.
[69] Helen Abadzi, *Efficient Learning for the Poor*, 127-130.
[70] Kim, Boyle, Zuilkowski, and Nakamura, *Landscape Report on Early Grade Literacy*, 53-54.
[71] Ibid., 13-15.
[72] Ibid.
[73] Tilson, Allemano, Mereku, and Marfo, *Evaluation of the USAID-Funded Textbooks and Learning Materials Programs (TLMP) in Ethiopia, Ghana, Malawi, Senegal, South Africa and Tanzania*.
[74] Saima Malik, Beatrice Balfour, Jean Providence Nzabonimpa, Sofia Cozzolino, Gabriela Dib, and Amy Jo Dowd, *Endline Evaluation of Rwandan Children's Book Initiative (RCBI)* (Kigali, RW: Save the Children, 2015), 2.

other words, simply giving books is insufficient. The books need to match the students' abilities and needs, and the teachers need to know how to teach reading effectively with the books.

6. Providing Tools and Training for Student Assessment

Teachers need to understand what their students do not know in order to adjust instruction. Therefore, assessments are a critical part of effective literacy instruction.[75] Given literacy development's step-by-step nature rooted in a rigid sequence of skill acquisitions, teachers should know where each student lies on the spectrum of development. Without proper assessment, teachers cannot cater instruction. Effective EGR interventions should train teachers and give them to tools to conduct assessments, analyze results, and modify their instruction.

Assessment directly links to the accountability of schools to the community. Education specialists broadly recognize assessment as complementary to accountability and autonomy so that education systems respond to local needs with quality education. Ideally, the presence of autonomy, assessment, and accountability fosters more time-on-task, effective teacher training, and attention to subject matter leading to higher education quality.[76] Primarily, assessment of students' progress in reading skills presents an opportunity to strengthen accountability. If teachers properly explain assessment results, parents and school administrators will understand students' progression and respond accordingly. Parents influence schools through school management committees and school administrators make personnel and budget decisions.

V. Evidence of Impact and Cost-Effectiveness

With EGR interventions defined, this section turns to the evidence of their impact and cost-effectiveness. Specifically, it will seek to understand 1) whether or not EGR interventions consistently improve reading skills measured in terms of various EGRA test components across a variety of contexts, 2) the magnitude of the impacts, 3) the cost and cost-effectiveness of the interventions, and 4) whether they are the best intervention for improving literacy rates.

Over 10 years of implementation, EGRA has yielded massive amounts of information on EGR in over 50 countries. However, most of the data relate to baseline surveys and correlational studies. A limited number of rigorous evaluations using experimental and quasi-experimental methods have examined the impact and cost-effectiveness of EGR interventions. This report will conduct an in-depth review of ten evaluations implemented by RTI International, Social Impact, Stanford University, World Education, and the World Bank in Egypt, Jordan, Kenya, Liberia, Malawi, Nepal, Papua New Guinea (PNG), Rwanda, and Tonga. It will also provide a more cursory overview of evaluations conducted by the Education Development Center and World Education in Rwanda, Mozambique, and Senegal. All of these interventions have taken place since 2008. Methodologically, the evaluations used different sampling techniques and adopted different approaches for treatment and control groups.

---

[75] Kim, Boyle, Zuilkowski, and Nakamura, *Landscape Report on Early Grade Literacy*, 12-13.

[76] Harry Patrinos, Eduardo Velez, and Catherine Yan Wang, "Framework for the Reform of Education Systems and Planning for Quality," World Bank Policy Research Working Paper 6701 (World Bank, 2013), 4-6.

The criteria for qualifying as an EGR intervention are the inclusion of literacy-based training for teachers and targeting students in grades 1 through 4. These trainings tend to incorporate the evidence-based pedagogies that train teachers to teach literacy in the proper sequence and match instruction to skills. Impact for these studies is measured in terms of the difference-in-differences of various EGRA test components. ORF is the main EGRA component used for analysis. In addition to ORF difference-in-differences, the percent of students that score a zero for ORF (i.e. cannot read a single word) is a secondary impact measure. Furthermore, two other more basic EGRA test components, initial sound identification and correct letters per minute, are tertiary impact indicators. The former measures the percent of words for which students can correctly pronounce the initial sound and the latter is self-explanatory.

Where possible, impacts are also presented as standard deviations. In general, Jacob Cohen asserted that small effect sizes ranged from 0.2 standard deviations to under 0.5 standard deviations, a medium effect from 0.5 standard deviations to under 0.8 standard deviations, and a large effect anything 0.8 standard deviations or greater. Although, Cohen recommended these ranges as general guidelines and offered that relative effect sizes could adjust depending on the area of research.[77] Within the context of education research, the U.S. Department of Education's Institute of Education Sciences advises that "effect sizes of 0.25 standard deviations or larger are considered to be substantively important. Effect sizes at least this large are interpreted as a qualified positive (or negative) effect, even though they may not reach statistical significance."[78] Finally, education literature broadly recognizes an effect size of 0.5 standard deviations on a normal distribution for a metric such as a test score as equivalent to one year of schooling.

Generally, cost-effectiveness results were available in dollars per student instead of dollars per student per impact. Costs per student use the technical cost of implementation which excludes the costs for EGRA development, intervention development, post intervention, and administration. By looking only at technical intervention costs, the cost figure represents the cost to continue project implementation. To achieve per student costs the total technical EGR costs are divided by the number of students. There are numerous caveats to cost-effectiveness figures. As Figure 14 shows, not all evaluations had the same time frame. Likewise, some evaluations incurred interruptions, such as strikes in Kenya, that reduced implementation time and costs. Also the number of students in classrooms, which can vary widely, affects cost-effectiveness. Higher student to teacher ratios, as in Malawi, lowers the cost of implementation per student, but this lower cost partially reflects an obvious deficiency in the education system. Furthermore, different contexts have different needs. In Liberia, for example, basic classroom requirements consumed more resources. In other countries, EGR components account for a lot costs. Finally, program implementation happens on vastly different scales. By reaching more students, a project may reach a certain economy of scale which reduces costs per student. For these reasons, it is difficult to compare costs across countries and reach general conclusions about how much EGR interventions should cost. However, the data on cost-effectiveness underscore how much EGR interventions might cost in across developing countries.

---

[77] Jacob Cohen, *Statistical Power Analysis for the Behavioral Sciences* (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 25-27.

[78] U.S. Department of Education, *What Works Clearinghouse: Procedures and Standards Handbook Version 3.0* (Washington, DC: Institute of Education Sciences, 2014), 23.

The remainder of this section will explore the components, contexts, effects, and results of these interventions in order to make general conclusions about EGR interventions. After describing each intervention in-depth, the section will conclude with a discussion of the findings, particularly as they relate to insights from systematic reviews of primary school education interventions. In total, the evaluations demonstrate that EGR interventions consistently improve literacy skills. Although they do not always bring the average student to a point of reading comprehension, and they do not always improve average ORF scores substantially, at the very least they nearly always have large and significant effects on basic literacy skills such as initial sound identification and letter recognition. Thus, if nothing else, they help students develop foundational reading skills – which are often more than the status quo reading instruction. Despite some modest impacts, the impacts for certain evaluations are remarkable.

Figure 10: Components of Ten EGR Interventions

Country and Years	EGR Components					
	Literacy-Based Training for Teachers	Instructional Guides for Teachers	Ongoing Coaching for Teachers	Supplementary Materials	Training and/or tools for Assessment	Other
Egypt 2009 - 2011	✓	✗	✓	✗	✓	✓
Jordan 2013 - 2014	✓	✓	✗	✓	✗	✗
Kenya 2012 - 2014	✓	✗	✓	✓	✗	✗
Liberia 2008 - 2010	✓	✗	✓	✓	✓	✓
Liberia 2011 - 2015	✓	✓	✓	✓	✓	✗
Malawi 2011 - 2013	✓	✓	✓	✗	✗	✗
Nepal 2012 - 2014	✓	✓	✗	✓	✓	✓
PNG 2015	✓	✓	✓	✓	✗	✗
Rwanda 2013 to 2015	✓	✗	✓	✓	✓	✓
Tonga 2016	✓	✗	✗	✓	✓	✓

A number of tables and graphs guide the analysis throughout the section. Figure 10 summarizes the EGR components for each intervention, while Figure 11 details the impact of each study, and Figure 12 charts the effect sizes in terms of standard deviations. Figures 13, 15, and 17 graphically represent the impacts of some of the most effective EGR interventions according to ORF scores. Figure 16 shows that interventions that were less effective in terms of ORF were

still effective in terms of other measures. Furthermore, Figure 14 provides information on cost and cost-effectiveness. Appendix 2 compiles the methodological differences as well as the treatment and control groupings for the ten evaluations in the in-depth review. Appendix 3 condenses intervention components, impacts on ORF, and cost-effectiveness into one table.

1. Egypt - Girls' Improved Learning Outcomes (GILO)

USAID and the Egyptian Ministry of Education designed GILO to achieve gender parity in schools. Implemented by RTI International, the program featured a number of components beyond a typical EGR intervention, such as expanding access for girls, improving school management, and strengthening decentralized institutions. However, the EGR program elements were the most successful. Specifically, the program provided literacy-based training for teachers and various resources for instruction, including videos of instructional routines. The evaluation was carried out for 2nd graders.

The program produced impressive results. In the control group ORF scores increased from 9 cwpm to 12.1 cwpm – a 3.1 cwpm change. In the treatment group, scores increased from 11.8 to 26.9 cwpm – a 15.1 cwpm change. The effect size was 0.55 standard deviations.[79] The increase in syllable reading was even more substantial. The treatment group saw 192% increase compared to the control group's 18%.[80] Over a six-month period, the program cost $29.42 per student. Based on the success of the EGR elements, the Egyptian Ministry of Education decided to scale the program nationally. What originally started as program for 28 schools (with 30 controls schools) expanded to cover every primary school in the country.

2. Jordan - National Early Grade Literacy and Numeracy Survey

Beginning in 2013, USAID, RTI International, and the Jordanian Ministry of Education partnered to implement a one-year EGR intervention that would reach approximately 12,000 2nd grade students, at the price of $39.82 per student.[81] The intervention involved training for teachers focused on EGR and basic math skills, instruction guides for teachers, and basic materials for students to apply the lessons. The evaluation results were positive. In the control group ORF scores increased from 14.7 cwpm to 15.3 cwpm. In the treatment group, scores increased from 14.4 to 21.3 cwpm. The difference in differences amounts to an effect size of 0.46 standard deviations.[82]

[79] Amber Gove, Aarnout Brombacher, and Michelle Ward-Brent, "Sparking a Reading Revolution: Results of Early Literacy Interventions in Egypt and Jordan," *New Directions for Childhood and Adolescent Development* 155 (2017): 105.

[80] RTI International, *Girls' Improved Learning Outcomes (GILO): Final Report* (Cairo, EG: USAID/Egypt 2014), 5.

[81] RTI International, *Costing Early Grade Reading Programs*, 17.

[82] Gove, Brombacher, and Ward-Brent, "Sparking a Reading Revolution," 107.

Figure 11: Summary of Intervention Impacts in Terms of ORF Scores

Category	Length*	Country, Language, Year (grade)*	Control			Treatment			Impact	Effect Size	Significant?
			Before	After	Difference	Before	After	Difference	(DiD)		
Main Evaluations	1	Egypt (grade 2)	9	12.1	3.1	11.8	26.9	15.1	12	0.55	YES
	1	Jordan (grade 2)	14.7	15.3	0.6	14.4	21.3	6.9	6.3	0.46	YES
	2	Kenya, English (grade 1)	.	.	.	.	.	.	.	0.44	YES
	2	Kenya, English (grade 2)	.	.	.	.	.	.	.	0.45	YES
	2	Kenya, Kiswahili (grade 1)	.	.	.	.	.	.	.	0.41	YES
	2	Kenya, Kiswahili (grade 2)	.	.	.	.	.	.	.	0.35	YES
	2	Liberia 2008 (grades 2, 3)	18.14	25.82	7.68	20.83	49.61	28.78	21.1	0.8	YES
	4	Liberia 2012 (grade 1)	.	.	.	.	.	.	0.6	0.1	NO
	4	Liberia 2012 (grade 2)	.	.	.	.	.	.	6.1	0.3	NO
	4	Liberia 2012 (grade 3)	.	.	.	.	.	.	1.2	0	NO
	2	Malawi (grade 1)	0.3	0.2	-0.1	0.2	7.2	7	7.1	0.66	YES
	1	Nepal 2013 (grade 1)	0	8	8	0	15	15	7	.	.
	2	Nepal 2012 (grade 1)	0	12	12	0	18	18	6	.	.
	2	Nepal 2012 (grade 2)	9	17	8	6	24	18	10	.	.
	1	Nepal 2012 (grade 3)	10	16	6	11	21	10	4	.	.
	2	Rwanda, 2013 (grade 1)	.	.	.	.	.	.	.	0.14	YES
	2	Rwanda, 2013 (grade 2)	.	.	.	.	.	.	.	0.13	YES
	1	PNG (grades 3, 4)	.	.	.	.	.	.	.	0.04	.
	1	Tonga (grades 1, 2)	.	.	.	.	.	.	.	0.24	YES
Other Evaluations	1	Mozambique (grade 2)	0.38	1.1	0.72	2	3.3	1.3	0.58	.	.
	1	Mozambique (grade 3)	1.7	3.2	1.5	1.6	8	6.4	4.9	.	.
	1	Philippines (grade 2)	.	.	.	.	.	.	4.4	0.21	YES
	2	Senegal (grades 3-6)	.	.	.	.	.	.	.	0.8	YES
	1	Rwanda, 2012 (grade 2)	.	.	.	.	.	.	.	0.55	YES

*length is in terms of approximate school years

3. Kenya - Primary Math and Reading Initiative (PRIMR)

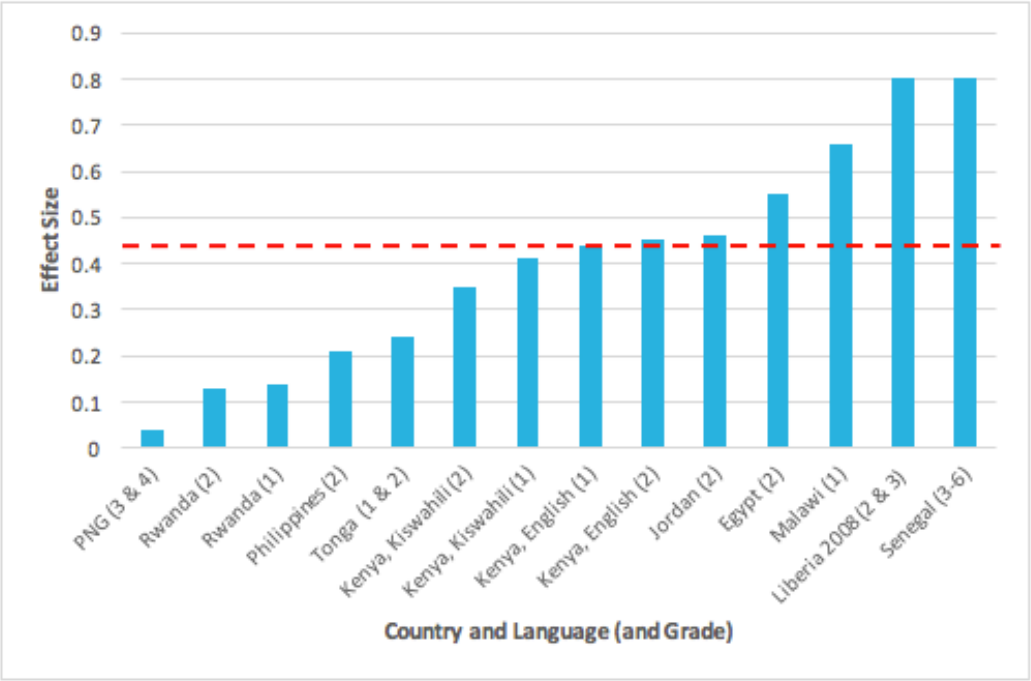
Funded by USAID, RTI International implemented PRIMR over three years in 547 public and low-cost primary schools for students in Grades 1 and 2. Geographically the program covered Nairobi, Kiambu, Nakuru, and Kisumu counties with the goal of strengthening basic skills in numeracy and literacy. For EGR, schools were divided schools into three cohorts which received phased introduction of the treatment for English and Kiswahili. The treatment consisted of new teaching and learning materials that corresponded with Kenya's primary education curriculum, teacher training on literacy instruction and methods, and coaches that visited teachers during lessons. The first cohort contained 125 schools and started receiving the treatment in January 2012. The second cohort had 185 schools with treatment beginning in January 2013. Finally, the third cohort acted as the control for two years, but eventually received the intervention.

The results for both English and Kiswahili indicated large effects. In English for 1st grade the treatment's effect size on ORF was 0.44 standard deviations and 0.45 standard deviations for 2nd grade. Kenya's Ministry of Education, Science, and Technology (MoEST) benchmarks emergent ORF at 30 cwpm and fluency at 65 cwpm. In the treatment groups 28.3% of the students reached the 65 cwpm, whereas the control only achieved 12.6%. For Kiswahili, the effect size for 1st graders was 0.41 standard deviations and 0.35 standard deviations for 2nd graders. MoEST's standard for emergent oral fluency in Kiswahili is 17 cwpm and full fluency is 45 cwpm. Only 15.9% of treatment students met the oral fluency target, but this was 9.2 percentage points greater than the control whose students achieved 6.7%.[83]

The share of children not reaching benchmarks for ORF remains the most troubling. While the treatment groups outperformed the control in both English and Kiswahili, 71.7% of children in the treatment did not reach full oral proficiency for English and 84.1% failed to do so for Kiswahili. These two figures underscore that even though PRIMR's early grade intervention was effective, many students failed to learn foundational reading skills. In terms of expenditures, RTI International notes that PRIMR costs $7.64 per student.[84] Clearly, PRIMR's provision of materials, teacher training, and mentorship to teachers substantiated itself as affordable and cost-effective. RTI International now leads Tusome Early Grade Reading Activity, the follow on to PRIMR that targets children in 1st through 3rd grades in nearly 28,000 schools across Kenya.

[83] RTI International, *USAID/Kenya Primary Math and Reading (PRIMR) Initiative: Final Report* (Nairobi: USAID/Kenya, 2015) xiii-xiv, 49, 53.
[84] RTI International, *Costing Early Grade Reading Programs*, 17.

Figure 12: ORF Effect Sizes in Terms of Standard Deviations



4. Liberia Early Grade Reading Assessment Plus (EGRA Plus)

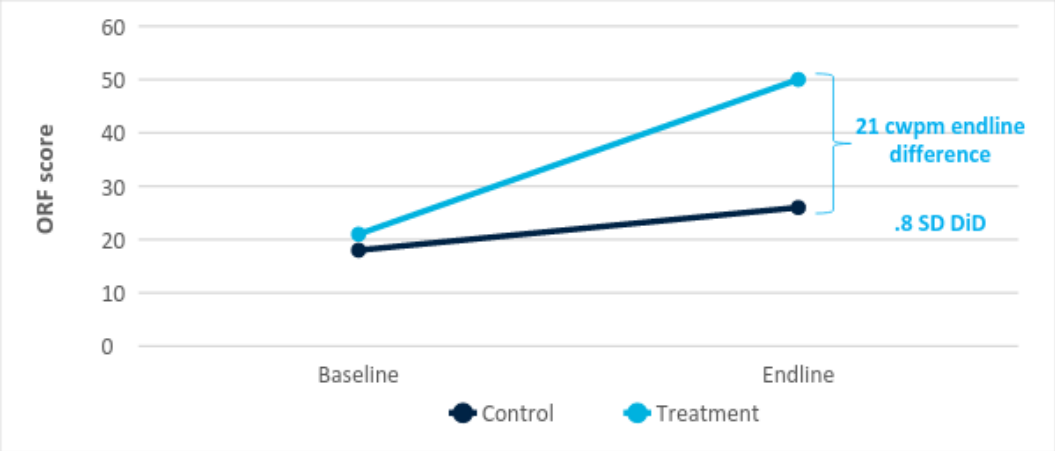
Liberia's EGRA Plus targeted students learning to read English in 2nd and 3rd grades. It was one of the first EGR projects supported by USAID. RTI International conducted an evaluation with three groups of 60 schools: full treatment, light treatment, and control. The full treatment entailed teacher training on literacy instructional methods and continuous assessment of reading skills. Instructional coaches supported the teachers in schools and worked directly with teachers to routinize key instructional techniques and practices. The teachers were given teaching materials and reading materials were distributed to students. Parents received information on student reading performance. In the light treatment teachers assessed student's reading performance and the information was given to parents.

The intervention demonstrated extremely robust results for ORF. As Figure 13 illustrates, the full treatment group improved its ORF from a mean of 20.83 cwpm at baseline to a mean of 49.61 cwpm at the end. The control improved from a mean of 23.70 cwpm to a mean of 31.5 cwpm. The difference between full treatment and control was an effect of 21.1 cwpm, equivalent to a substantial effect size of 0.8 standard deviations. The effect size is equivalent to nearly two years of schooling. The percentage of students with zero reading scores at the end of the program was only 6% for the full treatment, 20% for the control, and 21% for the light treatment.[85] Benchmarked against international standards the results reveal that Liberian students do not reading at the appropriate level.

[85] RTI International, *EGRA Plus: Liberia Program Evaluation Report* (Monrovia: USAID/Liberia, 2011), 3, 5, 31.

The evaluation compared the ORF of the Liberian students to standards from the Dynamic Indicators of Basic Early Literacy Skills. On average, the Liberian students in the full treatment were classified as at risk, meaning their scores were below the ORF standard set for their grade level, but encouragingly "children in the full treatment schools increased their ORF within grades more than international benchmark children."[86] Despite the substantial impact of EGRA Plus, it proved extremely cost-ineffective. The total program had a little over $1 million in technical expenditures for 2,825 treated students which equates to $387.76 per student.[87]

Figure 13: Changes in Average Correct Words per Minute for EGRA Plus



5. Liberia Teacher Training Program II (LTTP II)

The LTTP II was a partnership between RTI International and FHI 360 over four years that reached 1,020 schools in four counties of Liberia. The program intended to build on the success of EGRA Plus and targeted students in 1st through 3rd grades. RTI International's evaluation used two treatment groups and a control. Cohort 1 received the full reading intervention for 13 months before transitioning to only receiving student and teacher materials. Then Cohort 2 received the reading treatment for five months. The outbreak of the Ebola epidemic and subsequent closure of Liberian schools hindered the implementation of the LTTP II. The treatment included distribution of teacher and student materials, teacher training, coaching from instructional assistants, and assessment. The teachers received scripted lessons for literacy as well as other teaching aids, while students received activity books and books to read. Each school received 50 books per grade for their reading rooms. The training taught teachers how to teach children to read using scripted lessons with an initial training before the school year and a refresher training before the second semester. The instructional assistants visited the schools to reinforce the lessons from the teacher training and make sure the teachers had internalized the methods. Finally, teachers learned EGRA-like assessment techniques to track the progress of their students for different reading skills. The assessments became part of school report cards presented at meetings with parents.

[86] Ibid., 51.
[87] RTI International, *Costing Early Grade Reading Programs*, 17.

The LTTP II results were insignificant. Gains made between the baseline and midline assessments were not sustained by the end of the program. For 1st graders in both cohorts, the mean ORF scores dropped between the midline and endline. The endline difference-in-difference between the cohorts was 0.6 cwpm and the final effect size was an insignificant 0.1 standard deviations. Meanwhile, 2nd graders had mixed results with Cohort 1 declining in ORF between midline and endline, but Cohort 2 improving. The difference-in-difference between the two cohorts was 6.1 cwpm. The opposite movements in ORF scores created an effect size of 0.3 standard deviations which the evaluators deemed insignificant. Only the 3rd graders in both cohorts improved between midline and endline with a difference-in-difference between the cohorts of 1.2 cwpm. The effect size was zero. Ultimately, 1st and 2nd graders largely did not read fluently and only 3rd graders started to read with some degree of fluency.[88] The evaluation did not present any cost or cost effectiveness data.

Figure 14: Cost Information

Country	Cost (USD)	# of Students	Cost per Student	Time Frame
Egypt	1,027,506	34,930	29	oct '10 - apr '11
Jordan	437,500	10,986	40	sep '12 - aug '13
Kenya	1,575,647	206,151	8	jan '12 - aug '14
Liberia	1,095,429	2,825	388	oct '08 - apr '10
Malawi	537,712	264,869	2	jan '11 - nov -12
Tonga	.	.	183	~ 1 year

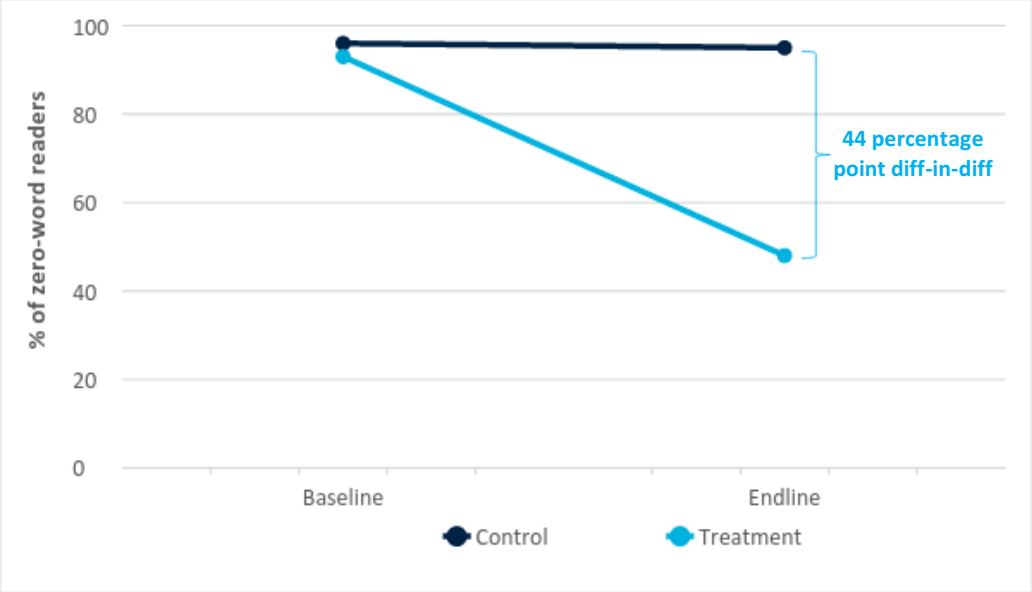
6. Malawi Teacher Professional Development Support Program (MTPDS)

In 2011, the Government of Malawi, USAID, and Social Impact joined together to undertake and evaluate a two-year EGR intervention targeted mainly at 1st grade students. At only $2.03 per student,[89] this intervention was by the far the cheapest of those reviewed in this report. It was also among the most impressive. The intervention included two main arms: one that involved a large conference-style literacy training for all 1st through 4th grade teachers in the country, and another that included the conference training along with more intensive literacy training, scripted lesson plans, and follow-up in-classroom training. The teachers chosen to participate in the latter treatment arm were randomly selected and compared to teachers in the first treatment arm as a control. ORF scores in the first group actually worsened. In the treatment group, ORF scores improved from 0.2 cwpm to 7.2 cwpm with a difference-in-differences of 7 cwpm. The effect size was 0.66 standard deviations [90] Meanwhile, the zero-word scores declined from 93% to 45% for the treatment group, while the rates only declined from 96% to 95% for the control group: a difference-in-difference of 44 percentage points.[91] These changes are illustrated in Figure 15.

[88] Simon King, Medina Korda, Lee Nordstrum, and Susan Edwards, *Liberia Teacher Training Program Endline Assessment of the Impact of Early Grade Reading and Mathematics Interventions* (Monrovia: USAID/Liberia, 2015), 19.
[89] RTI International, *Costing Early Grade Reading Programs*, 17.
[90] "Early Grade Reading Barometer: Malawi 2012, Chichewa," *USAID*, accessed 23 March 2017, http://www.earlygradereadingbarometer.org/trends/did.
[91] Tilson, Kamlongera, Pucilowski, and Nampota, *Evaluation of the Malawi Teacher Professional Development Support (MTDPS) Support Program*, 12-13.

There are several major implications resulting from the MTPDS study. First, large and impersonal trainings can be completely ineffective. Second, EGR interventions have the potential to deliver outstanding results, particularly in contexts where baseline scores are especially low. Third, they can deliver these results at a very low price.

Figure 15: Changes in Percentage of Students that Cannot Read a Single Word – MTPDS



7. Nepal Opportunity Schools Initiative

In 2012 World Education kicked off a two-year EGR intervention, the Opportunity Schools Initiative, targeted at Nepal's most underachieving districts, wherein 80% of 1st to 3rd grade students were not even proficient in their consonants or vowels. The intervention involved training teachers on literacy instruction and assessment, providing grade-appropriate reading materials, promoting instruction in native languages, and promoting parental and community engagement. Specifically, teachers were provided with stories to read to the students, methodologies for encouraging group work, materials for teaching phonics, and other literacy materials; students were provided with reading games and workbooks; and teachers were trained to apply an evidence-based literacy curriculum and to utilize their new resources.

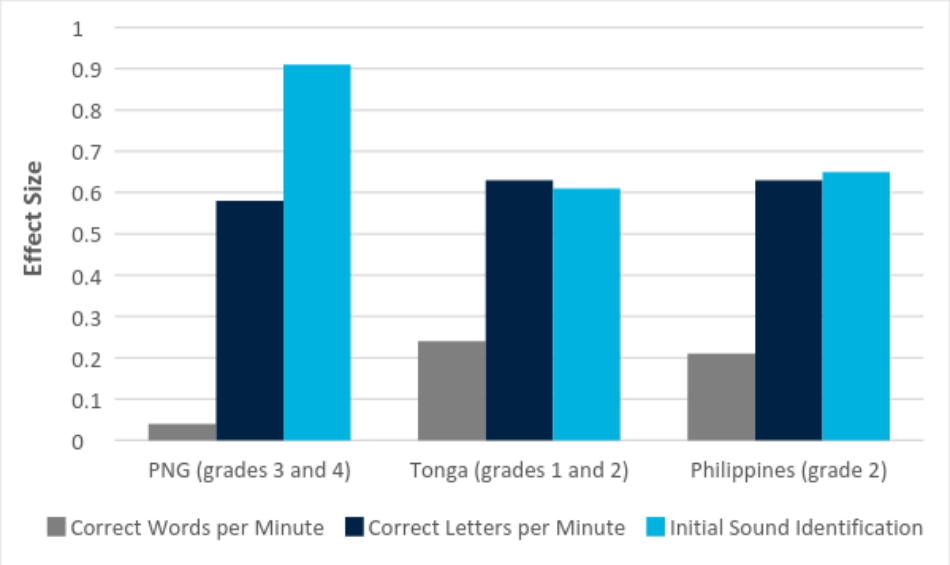
The intervention was implemented in 27 schools, and results were compared to 18 randomly selected control schools. Some groups received the intervention for two years, and another for one year. Considering the two-year group, the average cwpm for 1st graders in the treatment group improved from about 0 to 18, compared to a change from about 0 to 12: a 6 cwpm difference-in-difference. The average cwpm for 2nd graders in the treatment group improved from about 6 to 24, compared to a change from about 9 to 17: a 10 cwpm difference-in-difference.[92]

[92] World Education, *Early Grade Reading in Nepal* (Boston, MA: World Education, 2015), 5.

8. Reading Education Project for Papua New Guinea (READ PNG)

The World Bank recently partnered with the Government of PNG to implement an EGR program, READ PNG, which provided rigorous trainings and extensive feedback for teachers. The intervention also furnished follow-up monitoring and coaching inside the classroom, on-going remote support with text messages, reading books for students, and scripted lesson plans. The reading booster, designed as a short course in remedial reading skills, targeted students in 3rd grade. In PNG's Western Highlands Province the World Bank employed an evaluation with quasi-experimental techniques that featured 23 treatment and 23 control schools. A similar methodology was employed in Madang Province with 14 treatment and 14 control schools. Given that the reading booster emphasized students catch up in basic reading skills, the intervention produced positive results for initial sound identification, letter sound knowledge, and familiar word reading. While familiar word reading saw a much smaller effect size of 0.04 standard deviations, there were huge effects for others aspects: 0.91 standard deviations for initial sound identification and 0.58 standard deviations for letter sound knowledge. Figure 16 illustrates these effect sizes. Taking the three tests together, the average effect size was 0.51 standard deviations.[93] The evaluation also considered the spillover effects for more advanced reading skills tested by EGRA. For ORF in Western Highlands Province, the treatment group improved by 6.73 cwpm over the control. The effect size of the treatment's improvement was 0.8 standard deviations, the effect size when factoring out the improvement of the control was 0.10 standard deviations.[94] Altogether the intervention only cost $60 per student. In general, the reading booster was more effective at inculcating basic reading skills than ORF.

Figure 16: Effect Sizes for Various Test Components, for Projects with Lower ORF Effect Sizes



[93] World Bank, *Implementation Completion Report: Reading Education (READ-PNG) Project* (Washington, DC: World Bank, 2016), 35.

[94] World Bank, *Pilot Reading Booster Program in Western Highlands Province, Papua New Guinea* (unpublished evaluation report, Papua New Guinea Department of Education, 2015), 103.

9. Rwanda Literacy Boost

Save the Children implemented Literacy Boost in Rwanda for children in early primary school learning to read in Kinyarwanda. Stanford University's Graduate School of Education evaluated the Literacy Boost in Rwanda for a sample of Grade 1 and 2 students in 85 primary schools of the Gicumbi district. Stanford's team conducted a randomized control trial that divided the students into the Literacy Boost treatment, teacher training treatment, and a control group. In addition, there were two cohorts. Cohort 1 followed students starting in 1st grade for two years during 2013 and 2014 and Cohort 2 followed students starting 1st grade for 2014 only. The Literacy Boost treatment was the full intervention that comprised teacher training, coaching from instructional assistants, community action, provision of reading materials, and assessment trainings for teachers. Teacher training featured six sessions throughout the school year that imparted skills in classroom management and teaching literacy to children. The instructional assistant coaching occurred in schools between training sessions when the instructional assistants provided feedback on the application of skills learned in training sessions. The community action attempted to broaden reading activities outside of school through reading awareness workshops with parents, reading clubs for children, and reading festivals that were competitions at the village and district levels. For reading materials, Save the Children enlisted the Rwanda Children's Book Initiative that developed quality age appropriate books in Kinyarwanda. The assessment training enabled teachers to evaluate the development of literacy skills of their students throughout the school year. The teacher training treatment only trained teachers in literacy skills and offered none of the other types of support of Literacy Boost.

For Cohort 1 evaluated over two school years, the impact of the teacher training treatment was insignificant for ORF, but the full Literacy Boost treatment had a significant impact on ORF. Interestingly, the Literacy Boost treatment students did not affect the number of students who achieved the basic literacy threshold relative to the treatment. The basic literacy threshold was defined as a child "who identified more than 75% of the Kinyarwanda alphabet, scored at least 1 point of the decoding subtest, and scored at least 1 point of the dictation subtest."[95] In terms of ORF, the effect size for the Literacy Boost treatment was only 0.14 standard deviations for 1st grade and 0.13 standard deviations for 2nd grade, though the effects were significant.[96] Overall, Literacy Boost had positive but minor impacts on ORF for one district of Rwanda. The Stanford evaluation did not examine the cost-effectiveness of Literacy Boost.

10. Tonga Pacific Early Age Readiness and Learning Program (PEARL)

The World Bank recently carried out an EGR intervention PEARL in Tonga, which had large impacts. The intervention targeted several thousand 1st and 2nd grade students at 37 randomly selected schools, with 36 schools used as control. The program centered on training teachers in evidence-based literacy pedagogies that incorporate cognitive insights regarding sequencing and "balanced approaches to literacy learning."[97] On top that, it introduced community-based

[95] Elliot Friedlander and Claude Goldenberg, *Literacy Boost in Rwanda: Impact Evaluation of a Two Year Randomized Control Trial* (Stanford, CA: Stanford University, 2016), 179.
[96] Ibid., 68-71.
[97] Kevin Macdonald, Sally Brinkman, Wendy Jarvie, Myrna Machuca-Sierra, Kris McDonall, Souhila Messaoud-

playgroups for parents and children, public awareness campaigns, and provision of instructional materials.

In terms of the program elements geared specifically towards reading, the cost was about $183 per student. Impacts of the program differed across various elements of the EGRA test, but averaged out to about 0.3 standard deviations. More specifically, the effect for initial letter sound knowledge was 0.61 standard deviations and for letter sound knowledge it was 0.63. The effect size was smaller for ORF, at only 0.24 standard deviations.[98]

11. Other Evaluations

At least four other rigorous evaluations of EGR interventions carried out have reported significant and large effects. A one-year RCT in Mozambique tested the effects of an EGR intervention on 2nd and 3rd graders that provided training, coaching, and technical assistance for reading. The difference-in-difference impact for ORF was substantial for 3rd graders, at 4.9 cwpm. But the ORF impact was only 0.58 standard deviations for 2nd graders. That being said, the treatment group of 2nd graders performed much better than the control group on more basic sub-tasks, such as letter recognition.[99] In Rwanda, Senegal, and the Philippines, randomized control trials evaluated projects that included "structured instructional programs; scaffolded teacher support; research-based but contextually relevant reading, writing, and oral language materials; articulation of standards and benchmarks; and support for the development of a culture of reading."[100] There was a range of ORF effect sizes across countries: 0.8 standard deviations in Senegal, 0.55 standard deviations in Rwanda, and 0.21 standard deviations in the Philippines.[101] Although the effect sizes in the Philippines were relatively weak for ORF, they were still large for initial sound identification and correct letters per minute, at 0.65 standard deviations and 0.63 standard deviations respectively.[102]

Galusi, Siosiana Tapueluelu, and Binh Thahn Vu, *Pedagogy versus School Readiness: The Impact of a Randomized Reading Instruction Intervention and Community-Based Playgroup Intervention on Early Grade Reading Outcomes in Tonga* (Washington, DC: World Bank, 2017), 4.

[98] Ibid., 16, 38.

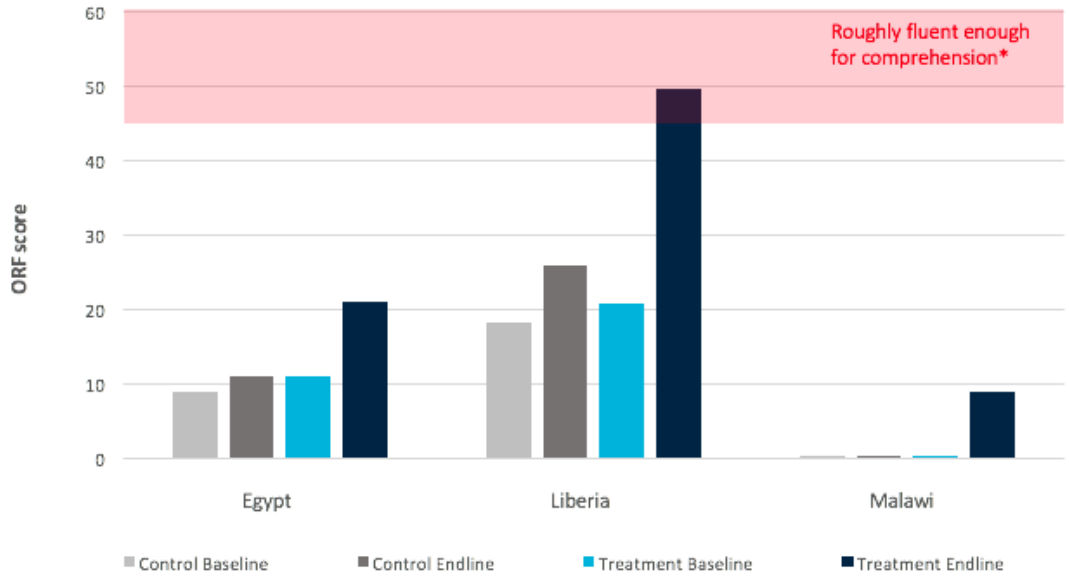
[99] Shirley Burchfield, Haiyan Hua, David Noyes, and Willem van de Waal, "Improving Early Grade Reading Outcomes: Aprender a Ler in Mozambique," *New Directions for Childhood and Adolescent Development* 155 (2017): 123-126.

[100] Rachel Christina and Elena Vinogradova, "Differentiation of Effect Across Systemic Literacy Programs in Rwanda, the Philippines, and Senegal," *New Directions for Childhood and Adolescent Development* 155 (2017): 53-54.

[101] Audrey-Marie Moore, Amber Gove, Karen Tietjen, "Great Expectations: A Framework for Assessing and Understanding Key Factors Affecting Student Learning of Foundational Reading Skills," *New Directions for Childhood and Adolescent Development* 155 (2017): 19.

[102] Christina and Vinogradova, "Differentiation of Effect Across Systemic Literacy Programs in Rwanda, the Philippines, and Senegal," 57.

Figure 17: DiD Impacts for Select Interventions



*45-60 cwpm is only a rough approximation of fluency required for comprehension; the average cwpm necessary varies greatly by language

12. Discussion of Evaluation Findings

This section has shown that EGR interventions are consistently effective at improving literacy. Most evaluations showed large and significant impacts for one of the main measures of literacy, ORF. Except for LTTP II, which was interrupted by Ebola, the only interventions with ORF effect sizes lower than 0.25 standard deviations were Literacy Boost Rwanda, PEARL, READ PNG, and Basa Pilipinas in the Philippines. These findings are illustrated in Figure 12. As Figure 16 shows, the studies for these countries found large effect sizes for more reading basic skills. Indeed, the only study with low effect sizes for all measures was Literacy Boost Rwanda, where effects sizes for ORF were only about 0.14 standard deviations and there was no significant impact on the country's measure for basic literacy skills. Overall, the ORF effects were significant; only one intervention failed to produce significant effects.

The impacts in some countries were remarkable. In Malawi, a two-year intervention that cost only $2 per student had the effect of reducing zero word scores by 48 percentage points compared to the control group. The EGRA Plus in Liberia and Harnessing Youth Volunteers as Literacy Leaders in Senegal produced effect sizes of 0.8 standard deviations. Furthermore, as Figure 17 shows, students in some countries are barely improving without the EGR intervention. In Malawi, for example, while the treatment group made major strides in average ORF scores, the control group actually worsened. While the chart shows that outcomes were not as egregious as control groups in countries like Liberia and Egypt, progress was still very slow, especially compared to the treatment group. In other words, students are often not learning to read without the EGR interventions, but they are learning to some degree with EGR interventions.

These positive findings are consistent with the broader literature on education interventions. A recent systematic review of education interventions found that the two interventions with the largest effects were adapting teaching methods to students' skills and recurrent teacher trainings.[103] An even larger systematic review asserted that "structured pedagogy programmes have the largest and most consistent positive average effects on learning outcomes."[104] Another review claimed that "almost all successful instructional interventions… include at least a minimal attempt to develop teachers' capacity to deliver effective classroom instruction."[105] While these reviews did not explicitly study literacy, the broader education literature agrees that training teachers on evidence-based pedagogies is effective. This report has built on this general finding by showing that such trainings are highly effective for improving literacy.

So EGR interventions seem the most effective option for improving literacy. But what about cost-effectiveness? Several scholars have pointed out that due to insufficient data, comparing the cost-effectiveness of various interventions is very difficult.[106] However, one study did show that teacher training interventions were among the cheaper and more cost-effective approaches to improving education outcomes. At the very least, they were not among the most expensive approaches, such as computer-based learning interventions.[107]

As Figure 14 shows, the cost of EGR interventions varies widely. As discussed at the beginning of this section, there are a large number of reasons for variability in cost-effectiveness. To reiterate, scale matters. Liberia was the most expensive and had the fewest students enrolled, but Malawi and Kenya were the cheapest and had the most students enrolled. That being said, class size also counts; Malawi may have been the cheapest per student but there is a good chance they also had the most students per class. On top of that, Figure 10 showed that different interventions had different components. For these reasons and more, it is difficult to make sweeping claims about the cost-effectiveness.

Despite the difficulty of comparing costs, examples from Kenya and Malawi illustrate the potential cost-effectiveness of EGR interventions. Likewise, they low cost facilitate scaling interventions to nationwide programs. Such was the case in both Kenya and Jordan.

To bring all of these findings together, EGR interventions have consistently large impacts on literacy outcomes. In light of the broader education literature, there is likely no other single type

---

[103] David Evans and Anna Popova, "What Really Works to Improve Learning in Developing Countries? An Analysis of Divergent Findings in Systematic Reviews," Policy Research Working Paper 7203 (World Bank, 2015), 12-15.

[104] Birte Snilstveit, Jennifer Stevenson, Daniel Phillips, Martina Vojtkova, Emma Gallagher, Tanja Schmidt, Hannah Jobse, Maisie Geelen, Maria Grazia Pastorello, *Interventions for Improving Learning Outcomes and Access to Education in Low- and Middle-Income Countries: A Systematic Review (Systematic Review 24)* (Washington, DC: International Initiative for Impact Evaluation, 2015), iv.

[105] Patrick McEwan, "Improving Learning in Primary Schools of Developing Countries: A Meta-Analysis of Randomized Experiments," *Review of Educational Research* 85, no. 3 (2015): 380.

[106] Evans and Popova, "What Really Works to Improve Learning in Developing Countries?," 17. McEwan, "Improving Learning in Primary Schools of Developing Countries," 377-379.

[107] McEwan, "Improving Learning in Primary Schools of Developing Countries," 377-379.

of intervention that so effectively enhances EGR outcomes as measured by EGRA components. On top of that, EGR interventions are frequently affordable. In developing countries with high levels of illiteracy at early ages, EGR interventions transform learning outcomes and set students on the path for success for a small price.

As a final note, this report does not contend EGR interventions are a panacea for improving education quality. Undoubtedly, other aspects of educations systems – including teacher incentives, school infrastructure, community involvement, early childhood development, and more – affect education quality. Even where EGR interventions had the largest impact, a large share of students remained illiterate. Likewise, as Figure 17 displays, even when students on average achieve large gains, students still on average fall below the established benchmark for ORF. And as Figure 16 illustrates, sometimes students barely make gains in ORF, and the only real gains occur for basic literacy skills. Overall, EGR interventions signify an important first step towards creating literate, well-educated populations in developing countries. As one study pointed out, education quality advances the most when multiple interventions work in tandem.[108] As such, once EGR interventions are implemented, they become a foundation for additional progress. Without capable teachers that have the resources and abilities to teach children to read, further strides towards higher quality education are impossible.

VI. Scope of Investment in Early Grade Reading

Since 2006 a wide range of multilateral institutions, bilateral development agencies, and NGOs have launched EGR interventions inspired by the EGRA tool. Anecdotally, the largest supporters have been the World Bank, GPE, and USAID. In order to quantify the investment, World Bank[109] and GPE[110] project databases and program documents were examined for evidence of funding for EGR interventions. Evidence included project activities explicitly linked to EGR such as teacher trainings, procurement and distribution of learning materials, and reading assessments. The analysis for the World Bank starts in 2006 – the year EGRA was developed – through 2016. The World Bank analysis considered every project with an education sub-sector. Project documents were examined for evidence of EGR funding by project component and subcomponent. In some cases, the level of detail in the documents limited the precision of estimates. For example, the World Bank's Learning, Equity and Accountability Program Support Project in the Philippines has three components. One subcomponent combines EGR and early grade mathematics, but the available documents only list the total cost of the component and do not differentiate the costs of reading and mathematics. In such cases, the analysis counted the entire component as EGR. The GPE analysis starts in 2006 and ends in 2015, the most recent year for which GPE published its data. After reviewing every funding commitment, the program documents suffered from the same complications as the World Bank analysis. The GPE analysis

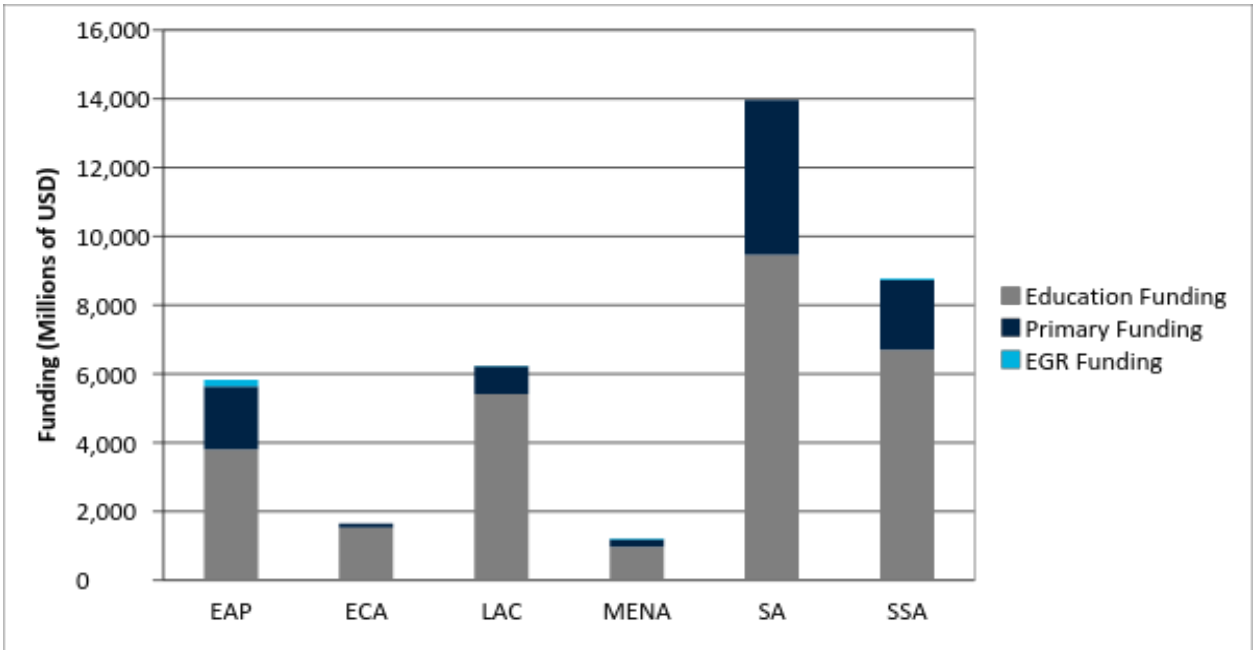
[108] Serena Masino and Miguel Nino-Zarazua, "What Works to Improve the Quality of Student Learning in Developing Countries," WIDER Working Paper 2015/033 (World Institute for Development Economics Research, 2015), 12.
[109] "World Bank Projects and Operations," *World Bank*, accessed 24 February 2017, http://data.worldbank.org/data-catalog/projects-portfolio.
[110] "Global Partnership for Education Activities," *International Aid Transparency Initiative*, last modified 9 June 2016, https://iatiregistry.org/publisher/gpe.

used the same approach. The investment figures presented for the World Bank and GPE are good faith estimates that likely overstate the amount of money allocated towards EGR by both institutions. USAID investment figures are ODA coded for education taken from the OECD Development Assistance Committee (DAC) database.[111] Unfortunately, it was impossible to estimate specific figures for EGR. Nonetheless, the education-related ODA from 2006 through 2015 is presented for illustrative purposes. The evidence suggests that the World Bank and GPE have not supported EGR to the same degree as USAID.

1. World Bank

The World Bank made $27.9 billion in education loans and grants. South Asia, Sub-Saharan Africa, and Latin America and the Caribbean received $21.6 billion or 77% of the total funding. Approximately $9.5 billion or 34% of the money went towards primary education. Primary education was the leading education sub-sector in South Asia, Sub-Saharan Africa, and East Asia Pacific. The investment in EGR totals $262 million: 2.8% of total primary education commitments and less than 1% of all education sector commitments. East Asia Pacific and Sub-Saharan Africa were the top regions for EGR investment. Figure 18 displays a regional comparison of investment in all education, primary education, and EGR. The spending on EGR represents 13 different projects with seven in Sub-Saharan Africa, three in Latin America and the Caribbean, two in East Asia and Pacific, and one in the Middle East and North Africa.

Figure 18: World Bank Education Commitments

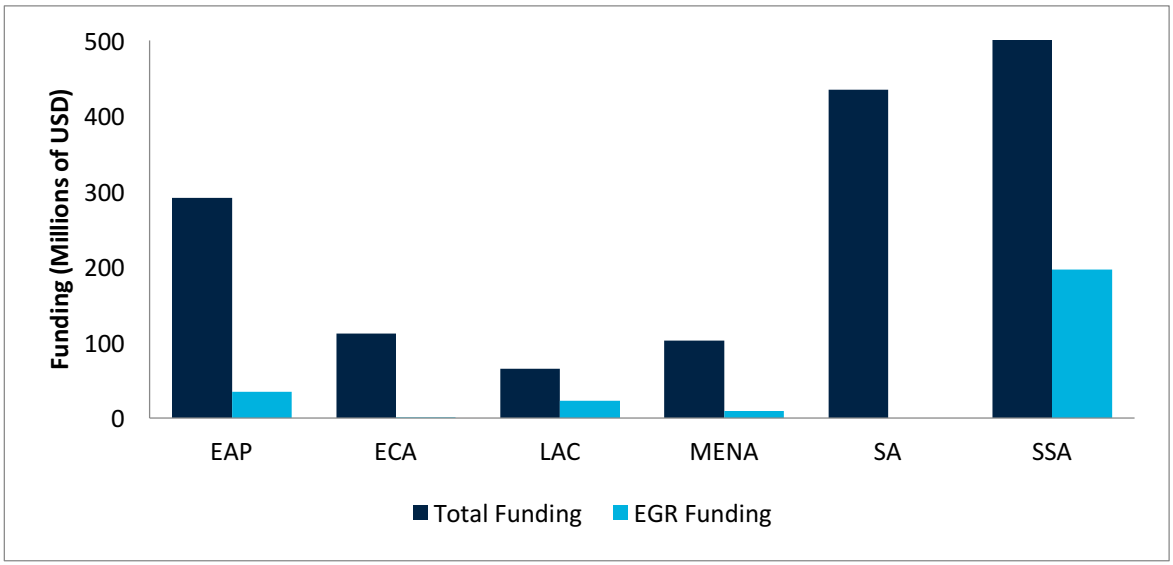


[111] "Query Wizard for International Development Statistics," *OECD*, accessed 24 March 2017, https://stats.oecd.org/qwids/.

2. Global Partnership for Education

GPE funded $4 billion in education programs. Sub-Saharan Africa accounted for nearly three-fourths of the money with $2.9 billion. South Asia and East Asia Pacific also received significant support from GPE: $435 million and $291 million respectively. Investments in EGR total $263 million or 6.6%. Again, Sub-Saharan Africa received almost three-fourths or $197 million of the EGR investments. East Asia Pacific and Latin America and the Caribbean also received considerable support as well. Figure 19 compares regionally total funding and EGR funding. The GPE investments represent 21 projects with 12 in Sub-Saharan Africa, six in East Asia and Pacific, and one each in Europe and Central Asia, Latin America and the Caribbean, and Middle East and North Africa.

Figure 19: GPE Funding Commitments

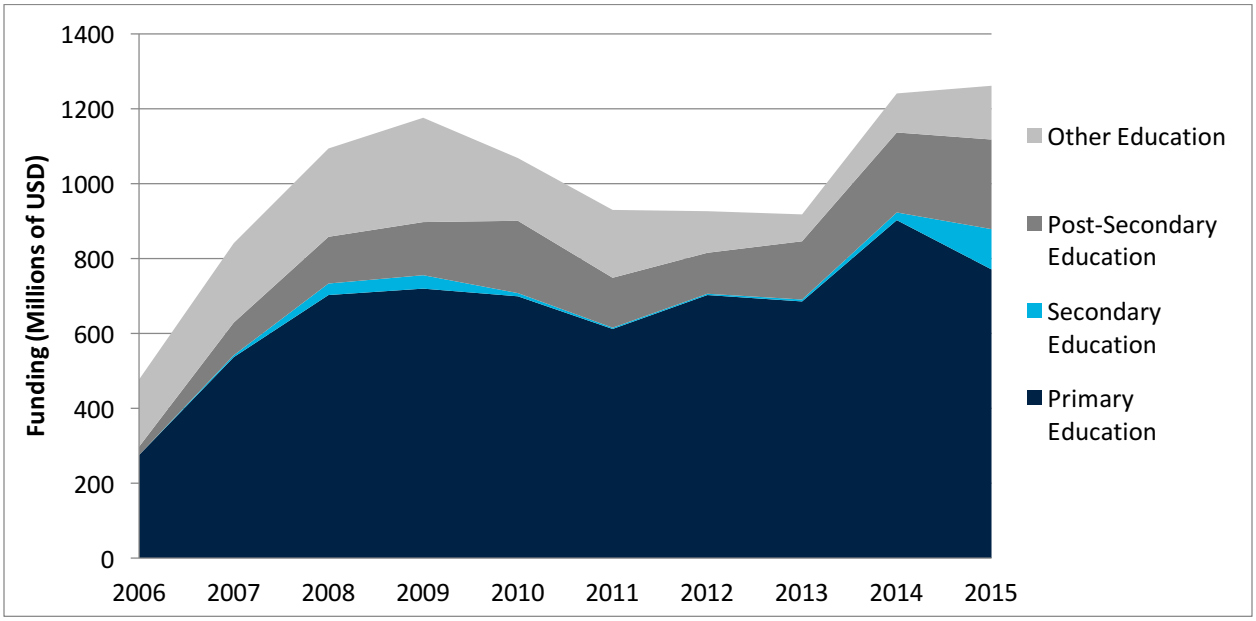


3. United States Agency for International Development

Data on levels of EGR spending for USAID are not accessible like the World Bank and GPE. However, the OECD DAC discloses ODA for different levels of education. USAID is the largest provider of education-related ODA of any bilateral development agency. Among its education-related ODA, USAID committed the most towards primary education in every year since 2006. The share of education ODA for primary education has ranged between 58% and 78% of total education ODA. Figure 20 contrasts the four different types of education-related ODA. USAID's primary education commitments targeted EGR interventions. Especially since 2010, the USAID Education Strategy has boldly committed the agency to supporting an EGR initiative known as All Children Reading with 88 EGR interventions in 41 countries.[112]

[112] USAID, *USAID Education Strategy Progress Report, 2011-2015* (Washington, DC: USAID, 2016), 32.

Figure 20: USAID Funding Commitments for Education



4. Key Findings

The acknowledgement of the EGR problem and subsequent mobilization of programs utilizing the EGRA have directed a considerable amount of money and expert attention on the issue. USAID has led the much of the global effort. While exact funding figures for EGR are unclear, the number of projects is considerable. The analysis of multilateral funding from the World Bank and GPE reveals that the amount of money relative to other education investments is surprisingly small. In addition, the World Bank and GPE individually have supported fewer EGR projects than USAID. Considering the proven effectiveness and cost-effectiveness of EGR programs, the World Bank and GPE should target more investment towards EGR.

VII. Recommendations and Conclusion

The preceding analysis informs four recommendations for the World Bank: to increase investment in EGR; foster deeper commitments by bilateral development agencies and large foundations; leverage EGRA as an accountability mechanism between teachers, parents, and school administration; and encourage countries to stop expanding post-basic education until they achieve universal early grade literacy. Developing countries should focus on achieving universal reading achievement in early grades. A prompt shift can yield measurable progress in a short amount of time. The World Bank is well-positioned to partner with developing countries willing to tackle the challenge illiteracy in developing countries.

1. Increase Investment in Early Grade Reading Interventions

The World Bank's ability to render technical assistance on EGR and financial support through loans and grants positions it well to become the primary organization to underwrite EGR across the globe. Since the inauguration of its new education strategy, USAID has been the largest

funder of primary education among members of the OECD DAC ranging from $586 million to $808 million in ODA.[113] Unfortunately, USAID's commitment to that role remains unclear. The President proposed a budget that will cut appropriations for the U.S. Department of State and USAID by 28%.[114] The budget proposal emphasizes the U.S. commitment to global health initiatives, but remains silent on education. While the initial reaction from Congress suggests a high degree of skepticism regarding the President's budget, the budget and appropriations committees in both chambers have not decided whether to cut appropriations.

Potential policy changes by the United States create an opportunity for the World Bank in the EGR space. The World Bank has the financial capacity to furnish a substantial amount of funding towards EGR. However, interested countries will require much more than funding to realize EGR goals. The World Bank will have to mobilize technical expertise that can operationalize effective EGR interventions. In particular, developing countries will likely demand expertise that facilitates the development of literacy-focused teacher training, conception of scripted lessons and other instructional guides, formation of instructional assistants required to reinforce instructional techniques, alignment of curricula with early reading needs, creation of grade level and language appropriate reading materials, enhancement of overall assessment capacity, and general provision of monitoring and evaluation. The World Bank should catalog the capacities for these different areas in order to make a clear pitch to interested countries about how the World Bank can support and advance EGR.

The World Bank should target its EGR investments at interested low income and middle income countries interested in EGR investments. Such countries include developing countries that have to date not attempted to strengthen EGR outcomes, but also developing countries that have made significant progress. The second group is significant since evaluation evidence illustrates that even when EGR interventions engender significant gains, far too many students cannot reach national or international reading benchmarks. EGR interventions should move beyond pilot programs. At this point, the weight of evidence establishes the proof of concept for EGR interventions. Instead, new initiatives should initially strive to serve a substantial portion of a country's provinces before scaling the program to the national level. In this way EGR will maximize the students that it benefits. Already Kenya, with the support of USAID, launched Tusome as its nationwide EGR program and the Philippines undertook its own nationwide effort with the World Bank through the Learning Equity and Accountability Program Support Project.

2. Foster Commitment from Bilateral Development Agencies and Large Foundations

The World Bank should promote EGR among bilateral development agencies and enlist the agencies which have the ability to take on a greater role. Such an effort will amplify the technical assistance and funding available to interested countries. Already, the United Kingdom Department for International Development (DFID) has supported EGR with approximately 17 different projects. In 2015 DFID was the world's second largest bilateral agency in terms of

[113] "Query Wizard for International Development Statistics," *OECD*, accessed 24 March 2017, https://stats.oecd.org/qwids/.

[114] *America First: A Budget Blueprint to Make America Great Again* (Washington, DC: Office of Management and Budget, 2017), 33-34.

funding for primary education with $255 million designated. Similarly the Norwegian Agency for Development Cooperation (NORAD) has advanced EGR through support for teaching training via GPE and Save the Children's Literacy Boost. NORAD is the third largest bilateral development agency for primary education with $197 million in ODA during 2015. Australian Aid with $141 million of primary education ODA in 2015 sponsors the All Children Reading grand development challenge in conjunction with USAID and World Vision. Two bilateral development agencies in the OECD DAC's top six for primary education ODA require encouragement to support EGR: European Union agencies and Deutsche Gesellschaft für Internationale Zusammenarbeit. Each respectively provided $177 million and $163 million of primary education ODA in 2015.

In addition to bilateral development agencies, large philanthropic foundations have a potential role in EGR. The William and Flora Hewlett Foundation previously supported EGR on six different projects implemented by RTI International. Also, the Bill and Melinda Gates Foundation has great potential to contribute to EGR's advancement. Currently, the Gates Foundation circumscribes its education initiatives to the United States, however, the foundation has started examining where it could add value to international education.

3. Leverage EGRA as an Accountability Mechanism

As mentioned in section IV, education specialists widely recognize the value of assessment, accountability and autonomy for enhancing education quality. EGRA Plus, LTTP II, and Rwanda Literacy Boost attempted to use oral assessments as a way to enable teachers to communicate with parents about the progress of their children. Such an approach aims to raise accountability between schools and parents by informing parents about their children's academic achievement. It is unclear how much these three EGR interventions influenced accountability through their oral reading assessment components. Strikingly, most EGR interventions reviewed for this report eschewed opportunities to use oral reading assessments as mechanisms for enhancing accountability. That decision is myopic and constitutes a missed opportunity.

As the World Bank invests in EGR, it should encourage countries to train teachers on simple oral reading assessments and concretely use assessment results as an accountability mechanism for teachers with school administration and parents. The act of reporting such information to school administration and parents will induce a wider understanding of student achievement in EGR. Both school administration and parents can begin to concentrate efforts on education quality.

4. Delivering on Universal Basic Literacy for All Youth

The initial section of this report highlighted the tension in the SDGs between the pursuit of universal secondary education and universal basic literacy for all youth. Students frequently fail to progress onto secondary education without proper basic reading skills because such skills lay the foundation for other foundational skills in writing and mathematics. Even when students are passed by teachers throughout primary education despite their deficient reading skills, these students cannot excel in their secondary education and will not learn advanced skills demanded by labor markets. Therefore, they are condemned to lower earnings and suboptimal social outcomes detrimental to their personal lives and society. **Thus, no country should expand its**

post-basic education until it can achieve universal reading achievement in the early grades. Although provocative, it is feasible for developing countries willing to take action to start an intervention in one year's time and make substantial measurable progress in EGR for students in 1st through 3rd grades. The components of EGR interventions are known and proven as an excellent first step in effectively inculcating reading skills. The World Bank is poised to assume leadership for EGR and partner with countries ambitious and willing to promote basic reading skills that will enable individuals and societies to fulfill their potential.

Appendices

Appendix 1: Components of EGRA and Skills Tested [115] [116]

EGRA Subtask	Early Reading Skill(s)	Skill Test	Indicator
Letter name knowledge	Letter recognition	Name both upper and lower case letters	Correct letter names identified per minute
Phonemic Awareness	Phonemic awareness	Identify sounds in words	Number of sounds correctly identified
Letter sound knowledge	Phonics	Provide sounds of both upper and lower case letters	Correct letter sounds identified per minute
Familiar word reading	Word reading	Read one or two syllable words	Correct familiar words read per minute
Unfamiliar word reading	Alphabetic principle	Read one or two syllable non-sense words	Correct invented words read per minute
Oral reading fluency with comprehension	Oral reading fluency and comprehension	Read passage with accuracy and speed Respond to questions about content of passage	Correct words read per minute in a narrative Percentage of correct responses to questions after reading a narrative
Listening comprehension	Listening comprehension	Respond to questions about content of passage	Percentage of correct responses to questions after hearing a narrative
Dictation	Alphabetic principle	Write, spell, and use grammar	Percentage of overall early writing skills

[115] RTI International, *Early Grade Reading Assessment Toolkit* (Research Triangle Park, NC: RTI International, 2009) 20-22.
[116] World Bank, *East New Britain (ENB) Early Grade Reading Assessment (EGRA) Survey: 2012 Diagnostic Results Report* (Washington, DC: World Bank, 2014) 24.

Appendix 2: Summary of Evaluation Methodologies

Country	Implementer & Donor	Sampling	Grade(s)	Treatment(s) & Control	Evaluation Technique
Egypt 2009-2011	RTI International USAID	Schools selected from three governorates in Upper Egypt. Stratified random sample by gender and grade.	Grade 2	Treatment: 28 schools Control: 30 schools	Difference-in-Differences
Jordan 2013-2014	RTI International USAID	Baseline: All 2,227 public primary schools with 193 removed for zero enrollment in Grades 2 and 3. Stratified by region and gender. 156 schools sampled with 3,063 students. Endline: Purposive including only education districts with at least three supervisors and minimum four sample schools. Schools participating in other interventions excluded. Sample selected from 12 of 38 districts.	Grades 2 & 3	Treatment: 45 schools from endline with purposeful selection of classes based on teacher criteria. Control: 110 schools from endline with classes and students randomly selected.	Difference-in-Differences
Kenya 2012-2014	RTI International USAID	Schools selected from population of 547 schools (government and private) in five counties. All private schools in Nairobi. Government schools selected only from Kiswahili-primary districts with TAC Tutor ratios of less than one per 25 schools.	Grades 1 & 2	Cohort 1 (Treatment): 66 government schools and 59 private schools Cohort 2 (Treatment): 65 government schools and 120 private schools Cohort 3 (Control): 51 government schools and 50	Difference-in-Differences

				private schools (received treatment in Year 3)	
Liberia 2008-2010	RTI International USAID	Randomized assignment to treatment and control based on geographic clustering	Grades 2 & 3	Full treatment: 60 schools Light treatment: 60 schools Control: 60 schools	Difference-in-Differences
Liberia 2011-2015	RTI International USAID	1,073 schools in four counties randomly selected and clustered into groups of 12 based on geography	Grades 1-3	Midterm Cohort 1 (Treatment): 62 schools Midterm Cohort 2 (Control): 36 schools Midterm External Cohort (Control): 45 schools outside of four counties Endline Cohort 1 (Quasi-Treatment): 55 schools Endline Cohort 2 (Treatment): 53 schools Endline External Cohort (Control): 50 schools outside of four counties	Difference-in-Differences
Malawi 2011-2013	Social Impact USAID	Purposive selection. Two districts purposively selected for intensive treatment with 16 schools total. Light treatment selected from two neighboring districts for comparability, 16 schools chosen.	Grade 2	Level 1 (Light Treatment) - 16 schools Level 3 (Intensive Treatment) - 16 schools	Difference-in-Differences
Nepal 2012-2014	World Education Private Donors	Random selection of 45 schools in two districts	Grades 1-3	Treatment: 27 schools Control: 18 schools	Difference-in-Differences

Papua New Guinea 2015	World Bank GPE	Madang: Schools randomly assigned to control and treatment. WHP: Schools stratified by proportional allocation according to district and school type, then randomly assigned to control and treatment. Schools excluded from sample because of insecurity, inaccessibility, enrollments too low, English not main language of instruction, and school not fully operational.	Grades 3 & 4	Madang Treatment: 14 schools Madang Control: 14 schools WHP Treatment: 23 schools WHP Control: 23 schools	Difference-in-Differences
Rwanda 2013-2015	Stanford University Save the Children	Schools selected from one district in Rwanda. Randomization at sector level, 21 sectors. First, 4 sectors in which Kinyarwanda not spoken at home by large percentage of students assigned to three groups. Second, remaining 17 sectors ranked as low, medium, or high performance based on school leaving exam scores. Within achievement groups, schools assigned to treatment and control.	Grades 1-3	Full Treatment: 7 sectors Light Treatment: 7 sectors Control: 7 sectors Each sector had 4 to 5 schools	Difference-in-Differences
Tonga 2016	World Bank GPE	Random selection of schools stratified by island, public/private school, if students received ECE intervention, number of students in first six grades. Schools excluded from selection if receiving two other ongoing primary school pilots.	Grades 1 & 2	Treatment: 37 schools Control: 36 schools	Difference-in-Differences

Appendix 3: Summary of Evaluation Results

Country Evaluator Year	Interventions	Impacts*	Cost**
Egypt RTI International 2009 to 2011	Teacher training on literacy instruction Coaching from instructional assistants Provision of structured lesson plans (video guides) Provision of tools and training for student assessment Teacher training on gender sensitivity Improved school management Improved access to school for girls	12 cwpm ORF, 0.55 SDs	$29.42 per student
Jordan RTI International 2010 to 2012	Teacher training on literacy instruction Provision of structured lesson plans	6.3 cwpm ORF, 0.46 SDs	$39.82 per student
Kenya RTI International 2012 to 2014	Teacher training on literacy instruction Coaching from instructional assistants Provision of supplementary instructional and reading materials	1st Grade English: 0.44 SDs 1st Grade Kiswahili: 0.41 SDs 2nd Grade English: 0.45 SDs 2nd Grade Kiswahili:	$7.64 per student

		0.35 SDs	
Liberia RTI International 2008 to 2010	Teacher training on literacy instruction Teacher training on student assessment Coaching from instructional assistants Provision of supplementary instructional and reading materials Communication of reading assessment results with parents	21.1 cwpm ORF, 0.8 SDs	$387.76 per student
Liberia RTI International 2011 to 2015	Teacher training on literacy instruction Coaching from instructional assistants Provision of supplementary instructional and reading materials Provision of structured lesson plans Regular assessment of students' reading skills by teachers	Grade 1 ORF: 0.6 cwpm for Grade 1, 0.1 SDs Grade 2 ORF: 6.1 cwpm, 0.3 SDs Grade 3 ORF: 1.2 cwpm, 0 SDs	No cost effectiveness data
Malawi Social Impact 2011 to 2013	Teacher training on literacy instruction Coaching from instructional assistants Provision of structured lesson plans	ORF: 7 cwpm, 0.6 SDs	$2.03 per student

Nepal World Education 2012 to 2014	Teacher training on literacy instruction Provision of tools and training for student assessment Provision of supplementary instructional and reading materials Promotion of instruction in native languages Promotion of community and parental involvement	Grade 1 ORF: 6 cwpm Grade 2 ORF: 10 cwpm Grade 3 ORF: 4 cwpm	No cost effectiveness data
Papua New Guinea World Bank 2015	Teacher training on literacy instruction Monitoring and feedback to teachers Provision of structured lesson plans Provision of supplementary instructional and reading materials	WHP ORF: 6.73 cwpm, 0.1 SDs	No cost effectiveness data
Rwanda Stanford University 2013 to 2015	Teacher training on literacy instruction and creation of a classroom supportive of literacy Coaching from instructional assistants Provision of tools and training for student assessment Provision of supplementary instructional and reading materials Community action promoting reading outside of school - at home and in the community	Cohort 1 ORF: 0.14 SDs Cohort 2 ORF: 0.13 SDs	No cost effectiveness data

Tonga World Bank 2016	Teacher training on literacy instruction Provision of supplementary instructional and reading materials Promotion of community involvement in literacy	ORF: 0.235 SDs	$183 per student

*Unless otherwise noted, impacts are in terms of the difference in score changes between the control and treatment group. This goes for both standard deviations and the raw scores.
**Costs are calculated using only the technical cost of implementing the EGR intervention