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Landscape Report on Early Grade Literacy

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Executive Summary

The goal of this landscape report is to review and summarize available empirical evidence on early grade literacy acquisition and instruction in developing countries. To achieve this goal, papers with empirical data were searched, identified, screened, and reviewed on topics that included student-level factors (e.g., emergent literacy, oral language), larger contextual factors within which the student is embedded (e.g., home literacy environment, language of instruction, and larger system issues such as teacher education), and long-run considerations (e.g., sustainability, costs, and scaling up). The available empirical evidence was, then, rated by topic as strong, moderate, emerging or limited. The vast majority of studies reviewed were project-based work with a comprehensive, multicomponent approach, incorporating the 5Ts—teaching, time, texts, tongue, and test. The Big 5 skills identified in the National Reading Panel Report (National Institute of Child Health and Human Development [NICHD], 2000)—phonological awareness, phonics, reading fluency, vocabulary, and reading comprehension—were central in these projects.

Our review of the evidence revealed that overall, much progress has been made in the last decade. However, the review also clearly indicated that the vast majority of topical areas within the field of literacy in developing country contexts still lack rigorous evidence, and there is much work to be done. As shown in Table 1, the only area with strong evidence was foundational literacy skills i.e., emergent literacy skills and word reading. A moderate level of evidence is available at present about reading fluency and literacy instruction in multilingual contexts. Although encouraging, this is not sufficient to inform the development community on how to promote the higher-order, long-term goals of literacy acquisition and instruction—reading comprehension and writing (written composition).

> *"Once you learn to read, you will be forever free."*
>
> *— Frederick Douglass*

Some directions for the future include a focus on long-term perspectives and efforts. Although the need to improve students' literacy skills is dire and immediate, changing behavior (e.g., teachers' instructional practices; student's learning) takes a long time (Cochran-Smith & Zeichner, 2005) and therefore, requires sustained efforts. Furthermore, reading comprehension and writing are high-order

Table 1. Levels of evidence for the various areas reviewed in the this report

Topic Area	Level of Evidence
Emergent literacy skills	Strong
Oral language skills	Emerging
Reading fluency	Moderate
Reading comprehension	Emerging
Writing	Extremely limited
Literacy in multilingual environments	Moderate
Teacher knowledge and education	Emerging
Parental and community engagement	Emerging
Long-run considerations (costs, financing, scaling up, & sustainability)	Emerging

skills that are built on the development of many language and cognitive skills, which themselves take time to develop. Thus, successful reading and writing development to support students' accessing and producing complex ideas in written texts requires quality instruction across multiple years, not just a single year.

Another pattern that emerged in the review was the need for greater standardization in the reporting of international literacy improvement projects and studies. We acknowledge that project reports often serve different audiences and purposes. However, from the perspective of reviewing evidence, certain information is required to verify statements of findings. Consistency in reported information is critical, especially for comparison and replication purposes. Inconsistency was found in reporting quality of measures (reliability[1] and validity; equivalence of measures in longitudinal studies[2]), process of assignment to conditions, sample attrition, analytic approaches, basic statistical information (means, standard deviations, bivariate correlations), and effect sizes (e.g., Hedge's g or Cohen's d). Also absent was description or reference to instructional approaches in the treatment and comparison conditions, which are necessary to understand the context in which target treatment approaches work or do not work.

Overall, this review substantiates the systematic and systemic nature of literacy education. Promoting successful early grade literacy instruction and acquisition requires evidence-based, empirically tested, and scientific approaches as well as efforts of stake holders at multiple levels, from students, parents, teachers, community members, and leaders in the country.

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[1] Reliability should be reported for survey measures, observation, and scores using rubric as well as direct student assessments. For timed tasks, test-retest reliability or alternate form reliability are appropriate and internal consistency reliability such as Cronbach's alpha is inappropriate (Anastasi & Drake, 1954). Inter-rater reliability should be reported for classroom observation and scoring using rubric. Validity evidence includes correlations among measured skills.

[2] In longitudinal studies or intervention studies, if different measures are used at different times (e.g., pre- and post-tests), equivalence of measures in a construct (e.g., listening comprehension, reading fluency) should be established. That is, if two forms of a listening comprehension task are used in pre- and post-test, equivalence of those forms should be established prior to use.

Chapter 1. Introduction

Section A. Overview

This Landscape Report on Early Grade Literacy takes stock of where we are, as a global community of educators within the field of international development, in improving literacy acquisition in the early grades in low-income countries. Hence, the purpose of the report is to review relevant, recent research coming principally from developing country contexts on efforts to improve early grade literacy learning and instruction. The scope of this report includes reviewing evidence from the field on (1) what has worked in developing countries; (2) what practices show promise at this point even if the available evidence is not yet definitive; and (3) what the gaps in the literature/evidence base are. Within these large and overarching goals, topics of examination and discussion include:

- Cross cutting aspects in literacy instruction: Instructional time, assessment, and teaching and learning materials, including ICTs
- Skill building in the following areas: emergent literacy, oral language, reading fluency, reading comprehension, and early writing.
- Literacy acquisition in multilingual contexts
- Teacher knowledge, and teacher education practices
- Parental and community engagement
- Long-run considerations: costs, financing, scaling up, and sustainability of literacy programs

In this report, we define literacy in a traditional sense as the ability to read and write to gain and produce meaning in context. This is aligned with the UNESCO's Aspects of Literacy Assessment paper (2005) definition of literacy as "the ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve his or her goals, develop his or her knowledge and potential, and participate fully in community and wider society." (p. 21)

In 2010, the Early Grade Learning Community of Practice[3] published its landmark report "Early Reading: Igniting Education for All" (Gove & Cvelich, 2010). The report, largely drawing on the National Reading Panel's Report (NICHD, 2000), laid out the case for focusing on early grade reading and outlined the extant evidence on how children learn to read. The report synthesized existing research, much of it from Anglophone and "developed" countries, on teaching reading and highlighted the fact that reading was not explicitly taught in many low-income countries as a skill, much less a subject in early grades curricula. The report presented timely evidence from the application of the Early Grade Reading Assessment tool (EGRA) showing that children in many low income countries were not learning the basics of reading. These findings catalyzed serious debate and action around the world on the need to refocus basic education assistance

[3] Early Grade Learning Community of Practice Members include educators, government officials, and development practitioners, all dedicated to improving learning in the early grades in low income countries. The report can be downloaded from: http://www.rti.org/pubs/early-reading-report-revised.pdf

5Ts Framework

Teaching

Many teachers in developing country contexts have not had direct and explicit training in how to teach literacy. Many curricula do not include literacy as a discrete subject of instruction, hence teachers are not trained to teach it.

Time

The appropriate use of classroom time as well as securing sufficient time devoted to teaching literacy is vital. Literacy needs to be taught explicitly and directly, not as part of a larger language lesson.

Texts

In countries all over the world, age- and level-appropriate reading materials are lacking. Children need texts to practice and develop literacy skills.

Tongue

Many children around the world do not learn to read in a language they speak, much less their mother tongue, and this situation can have profound negative impacts on whether a child learns to read in any language.

Test

Instruction should be based on assessment (testing) in order to identify those who are falling behind and provide them ongoing support. Tests—or assessments—allow policy makers, teachers and others to keep the focus on student learning and make adjustments in light of students' performance.

programs on reading. Overall, the Gove and Cvelich (2010) report galvanized much needed attention from donors, INGOs, local NGOs and governments around the issue of early grade reading. The international development community took up the goal of improving early grade reading as a prerequisite to ensuring access to the knowledge that is a crucial part of quality education for all children, especially in developing countries.

In reviewing the evidence on early grade reading and writing acquisition and instruction in the last decade, it behooves us to discuss the 5Ts[4] (Teaching, Time, Texts, Tongue, and Test). Improving the acquisition of reading and writing skills in the early grades meant embarking on a steep learning curve for many stakeholders. USAID, as a donor particularly active in and committed to the improvement of early grade reading and writing skills, developed the "5 Ts" as a framework to use in scaling this learning curve and producing sound, evidence-based policies, practices and assistance programs (Gove & Cvelich, 2010). As a framework, the 5Ts assist donors, governments and NGOs to develop policies and direct resources toward improving reading outcomes.

Section B. Methods and Levels of Evidence

The team reviewed a wide range of published studies, including academic studies and project-based research. Several data bases such as ERIC and DEC were used, and a variety of donors (e.g., GPE, DfID, USAID) and NGOs which implement literacy projects worldwide were contacted to obtain evaluation reports. We also asked for recommendations from leaders (practitioners and academics) in the field regarding reports and articles to review. Reviewed studies employed a mixture of research designs in developing country contexts.[5] Although randomized control trials are the gold standard for causal inferences, it is not feasible to implement randomized control trials on all topic areas, and other types of studies (e.g., descriptive, correlational, and quasi-experimental) are useful for

[4] 5Ts were adapted from Allington (2002).

[5] The current review revealed many and deep gaps in the existing research in developing countries. Some topics have received minimal attention in developing countries, but have been well studied in the US or Europe or other higher income countries and we make reference to these as appropriate.

varying purposes. It should be noted that articles or papers without empirical data were not included in the current review.[6] In particular, in determining strengths of evidence and evaluating the extent of available evidence about improving early grade literacy skills, only studies that employed designs that allowed causal inferences (i.e., randomized control and quasi-experimental studies) were included.

In addition to rigorously reviewing recent research on early grade literacy, the team conducted a series of interviews with "thought leaders" from donors, INGOs, ministries, universities and others about their experience as part of the international development community working in and focused on early grade literacy. These interviews were recorded, transcribed, and analyzed. Hence, where applicable, we took into account expert opinion, as long as they are in line with defensible theories and interpretations of theories.

The team used a framework for evaluating evidence about early grade literacy adapted from the What Works Clearinghouse standards, developed by the Institute of Education Sciences, U.S. Department of Education.[7] Using this framework, evidence was categorized into four levels: strong, moderate, emerging, or limited. **Strong evidence** indicates consistent, causal, and generalizable evidence in the recommended practices. There is strong external validity evidence with multiple studies employing high quality causal designs for the given target population.[8] **Moderate evidence** indicates that although evidence does exist about recommended practices, strong causal conclusions cannot be generalized to target population due to lack of replication studies or causal ambiguity. **Emerging evidence** indicates no clear evidence about causal effects of the recommended practices due to lack of studies, or conflicting results. **Limited evidence** indicates lack of evidentiary materials. When determining levels of evidence, several factors were taken into consideration including the number of studies on the topic, the design and quality of the studies, and target population (whether the studies represent an appropriate range of participants and settings so as to be generalizable in a given context or with a given population), and expert opinions.

The level of evidence assigned to the findings represents the team's judgment of the quality of the existing research on the topic of improving early grade literacy achievement in developing country contexts. However, it does not represent a judgement of the relative importance of the topic.

When reporting impact of an intervention or instructional approach, we focused on effect sizes for consistency and substantive reasons. Effect sizes such as Cohen's d or Hedge's g are widely accepted as standards of reporting. The following has been widely used in the field when interpreting the size of effect sizes: small for effect sizes less than .3; medium for effect sizes around .5; large for an effect size larger than .8 (Cohen, 1988). However, this guideline should be interpreted with a heavy dose of caution because effect sizes should be interpreted in the context of other studies and substantive context (Cohen, 1988). For instance, many literacy intervention studies in developing contexts have reported large effect sizes (see below). This may be due to improved literacy instructional approaches in treatment versus control classrooms but may also be due to extremely low levels of literacy skills at baseline.

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[6] Single case design studies were excluded due to limited generalizability.

[7] Information about these standards is available at http://ies.ed.gov/ncee/wwc/documentsum.aspx?sid=19.

[8] Note that target population in this document refers to early grade children in developing countries. Although we acknowledge that this is much broader than in typical studies including randomized control studies, this broad definition is in line with the goal of the study.

Section C. Situational and Constraining Factors to Keep in Mind

Although the evidence base about effective literacy instruction in developing contexts is growing, gaps in our understanding are large and many. This is likely due to unique challenges in conducting rigorous research in some developing country contexts. There is often lack of research capacity, including trained researchers, data collectors, statisticians, social scientists and the like. Schools are often not accustomed to the presence of researchers and are generally unfamiliar with conducting site-based research. Ministries around the world face challenges in terms of information and data collection, human resource management, financing, tracking financial flows, and assessment of teachers, pupils and the system as a whole.

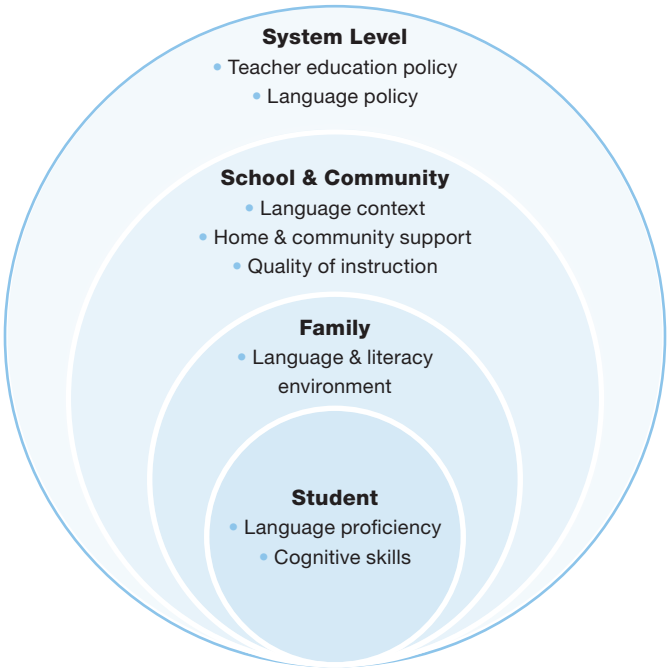
Likewise, the teaching and learning contexts in many low income countries also present challenges. Schools are frequently under-resourced (e.g. lack of electricity, water, furniture, books, chalk, paper and even buildings); teachers are generally untrained or undertrained in effective teaching methods and in the teaching of literacy specifically; schools are often remote and hard to reach; classrooms are often overcrowded (especially in the early grades); and incentive systems to motivate teachers and other educators to do their work, to make extra efforts, and in some cases to show up for work, are either weak or nonexistent. Student and teacher absenteeism is high. Curricula are often overcrowded with content and facts to be memorized and skills are not emphasized; national policies on textbooks and readers often impede the selection or development of appropriate materials. Conflict and crisis situations also impinge on students' socioemotional health, executive functioning, levels of stress and trauma and ability to concentrate and learn in school. School fees or the opportunity costs of schooling are often too high for low income parents; corruption saps the resources of the educational system; the culture of reading in schools and communities is often weak or nonexistent; and children often face challenging home environments where parents do not have the time, resources or expertise to devote to ensuring school attendance, homework completion, reading in the home or other appropriate reading support activities; likewise, communities underestimate the contribution they can make to children's attainment of literacy because so many members are illiterate (Brombacher et al., 2012; Collins & Messaoud-Galusi, 2012; Gove and Cvelich, 2011; Harber, 2014; Rugh, 2012; UNICEF and UNESCO Institute of Statistics, 2014; UNESCO Policy Paper 23, 2016; Verger, Novella, & Altinyelken, 2012).

We list this litany of challenges because it is important to take factors such as culture and context into account both in examining evidence on early grade literacy and in evaluating a particular approach, project, or intervention as effective. Although we know that the 5Ts provide a framework for developing literacy programs as well as for systematic and explicit instruction of core skills (e.g., orthographic symbol knowledge; see Chapter 2) that are beneficial across most languages (and certainly alphabetic languages), we know less about how these ideas will best take root and flourish in any given context—how solutions are presented and implemented is critical. The findings and recommendations in this report can be taken as starting points from which to build and shape locally appropriate, effective literacy programs.

Section D. Organization of the Report

Figure 1 illustrates the scope and the layers of literature examined in this report. There are many more factors (e.g., socio-emotional factors, learning in conflict and crisis contexts) that are important but beyond the scope of this report. Education by nature is a systemic, long-term endeavor. Although learning ultimately occurs at the student level, it is embedded in and influenced by multiple layers of contexts (Bronfenbrenner, 1979), ranging from family context, school and community, to system factors. Therefore, in addition to understanding child level factors that contribute to literacy acquisition, it is imperative to address issues

Figure 1. Factors contributing to literacy acquisition



at family, community, and system levels to ensure that all children learn to read in the early grades.

The chapters in this report address some of the factors within this framework. In Chapter 2 we provide an overview of key areas necessary to successfully promote improved early grade literacy skills. This chapter provides the framework for understanding the development of reading skills and then reviews important cross cutting factors such as the level of instruction and materials, instructional routines, time, achieving automaticity, assessment, and information and communication technologies (ICTs). In Chapter 3, we discuss key areas to successfully promote improved early grade literacy skills by area. Specifically, we discuss student level factors from developing country contexts—evidence about the core skills of learning to read and write such as emergent literacy skills, oral language skills, reading fluency, reading comprehension, and writing. In Chapter 4, we focus on factors at the teacher, school, community and system levels that impact the process of learning to read and write in many developing country contexts. Topics include literacy acquisition in multilingual contexts, teacher knowledge and education, and parental and community engagement. In Chapter 5, we examine factors related to long-term considerations for governments and donors, including cost, financing, scale up, and sustainability. Finally, Chapter 6 concludes the report with an overall discussion of recommendations moving forward and research gaps to be addressed.

The structure of each chapter varies to some extent depending on nature of particular content. However, the following overarching structure was employed where possible:

- What is the topic and why is it important to early grade literacy?
- What evidence exists on the topic especially in developing countries?
- What are the design consideration and challenges related to the topic, including a discussion of:
  - Instructional approaches
  - Instructional materials
  - Assessment
  - The use of ICTs
- What research gaps exist with respect to the topic?

Chapter 2. Key Areas to Successfully Promote Improved Early Grade Literacy Skills: Overview

Section A. A Framework for Understanding Reading Development

What does it take to read and comprehend written texts? Reading development involves highly complex language and cognitive processes, requiring development and coordination of multiple skills through a developmental sequence. As shown in Figure 2, reading comprehension—the ultimate purpose of learning to read—requires, at minimum, word reading or decoding (the word reading) and listening comprehension (oral language comprehension at the discourse level) (Gough & Tunmer, 1986; Hoover & Gough, 1990). Reading fluency is also necessary, acting as a bridge or a partial mediator, connecting word reading and listening comprehension to reading comprehension (Kim, 2015b; Kim & Wagner, R. K., 2015). If word reading and listening comprehension are two necessary skills for reading comprehension, how do these skills develop? Each of these skill areas is built on a complex set of foundational skills.

Foundations for word reading (and spelling) include emergent literacy skills such as print awareness, orthographic symbol knowledge, phonological awareness, morphological awareness, and orthographic awareness (see building blocks in Figure 2). These emergent literacy skills map onto the three types of knowledge that need to be activated for word reading: phonology (sound structure), orthography (writing system), and semantics (meaning) (see Adams, 1990; Seidenberg, & McClelland, 1989 for further details).

Word reading and listening comprehension are both vital to reading comprehension across languages and writing systems.

(Adolf, Catts, & Little, 2006; Florit & Cain, 2011; Foorman, Koon, Petscher, Mitchell, & Truckenmiller, 2015; Gracia & Cain, 2014; Joshi, Tao, Aaron, & Quiroz, 2012; Kendeou, Papadopoulos, & Kotzapoulou, 2013; Kendeou, van den Broek, White, & Lynch, 2009; Kim, 2011, Kim, 2015a; Lee & Wheldall, 2009).

Listening comprehension is the "ability to comprehend oral language at the discourse level—including [multi-utterance] conversations, stories, informational oral texts—that involves the processes of extracting and constructing meaning" (Kim & Pilcher, 2016, p. 160). Listening comprehension is even more complex than word reading, and draws on foundational cognitive skills such as working memory (the ability to hold and manipulation information during a short time period), inhibitory control (the ability to suppress a dominant response and initiate a subdominant response), attentional control; and foundational oral language skills such as vocabulary knowledge, and grammatical knowledge; and higher-order cognitive skills such as inference, perspective taking and reasoning, and comprehension monitoring (Florit, Roch, & Levorato, 2014; Kendeou, Bohn-Gettler, White, & van den Broek, 2008; Kim, 2015a, 2016a; Kim & Phillips, 2014; Lepola, Lynch, Laakkonen, Silvén, & Niemi, 2012; Tompkins, Guo, & Justice, 2013). In other words, listening comprehension is an upper-level skill that requires a complex array of language and cognitive skills (Kim, 2015, 2016a;

see Figure 3). Given the complex set of skills that contribute to the development of listening comprehension, listening comprehension takes a prolonged time to develop, and is a much larger area than word reading (Paris, 2005; Snow & Kim, 2007). In fact, learning never ends for some areas of oral language such as vocabulary. Furthermore, these language and cognitive component skills (e.g., vocabulary and reasoning) develop in tandem.

In summary, without appropriate development of emergent literacy skills, word reading would not develop properly. Without appropriate development of language and cognitive skills, listening comprehension would fail to develop. Consequently, children would fail to develop reading fluency and reading comprehension.

Section B. Cross-Cutting Factors in Literacy Instruction

The foundational skills of literacy acquisition start developing first in the home and in the community. However, the primary focus of literacy instruction in many contexts is in the formal school setting. Below are several cross cutting factors that are applicable to classroom instruction contexts in terms of instruction, assessment, instructional materials, and ICTs.

Instructional Considerations

Developmentally-appropriate instructional content

Learning occurs when instruction targets the right content at the right level for students' needs (Vygotsky, 1978). Curriculum or instructional content

Figure 2. Component skills of reading comprehension and their structural relations. *Reprinted from Kim (2016b) with permission.*

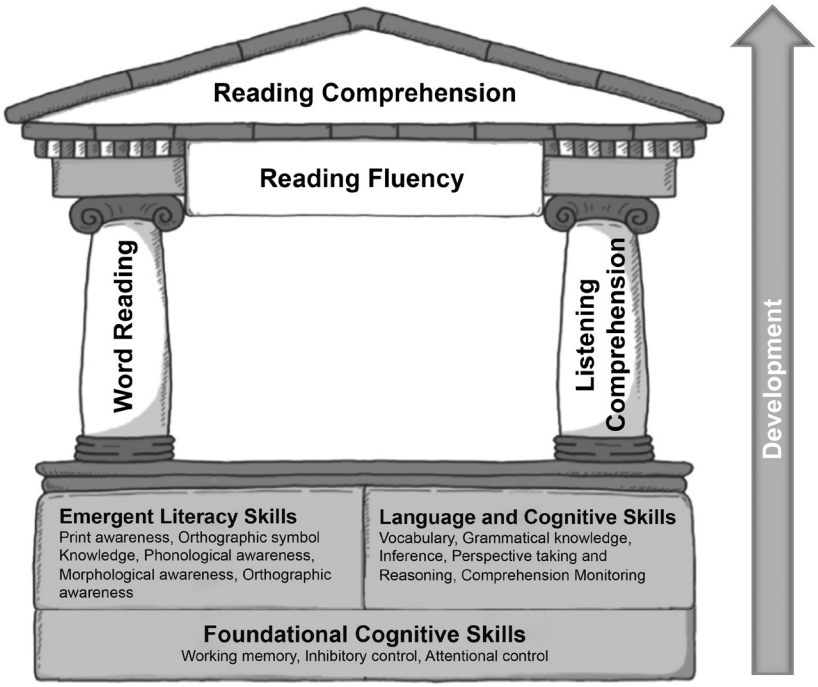
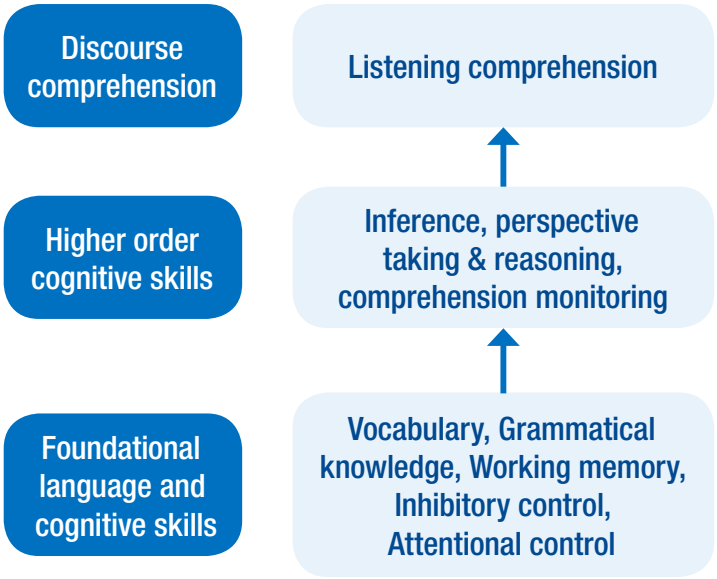


Figure 3. Language and cognitive skills that contribute to listening comprehension *(Kim, 2016a, reprinted with permission)*



Oral language is a larger construct than word reading, and takes a prolonged time to develop.

in many low-income countries is too difficult and ambitious for students' skill levels (ASER, 2011; Piper, 2010a; Crouch, Korda, & Mumo, 2009; Pritchett & Beatty, 2015). In such cases, there is a need to revise the scope and sequence of early grade curricula to align with evidence-based and scientifically-validated research on literacy development as well as national assessment results.

Moreover, even when the curriculum content is appropriate, the appropriate level of instruction varies widely across students, as students differ in where they start and how fast they learn the target skill. Therefore, effective instruction should address and meet the varying needs of students informed by assessment results. This is often referred to as differentiated instruction (e.g., Connor et al., 2013). Operationalization of differentiated instruction would vary across contexts due to differences in environments and resources (e.g., class size).

Instructional routines

The establishment of instructional routines has been shown to help teachers (RTI International, 2011; EDC, 2013). The following sample instructional routine (Rosenshine, 1995; Rosenshine & Stevens, 1995) has been used successfully in developing country contexts such as Kenya (e.g., RTI International, 2011).

- Review and check previous work
- Present new material
- Provide guided practice
- Provide feedback and corrections
- Provide independent practice
- Provide weekly and monthly reviews

The goal of this framework is to promote scaffolded instruction and gradual release of responsibilities (Duke & Pearson, 2002; Pearson & Gallagher, 1983). In scaffolded instruction the teacher initially assumes all the responsibility for performing a task, and gradually and incrementally transfers responsibility for performing the task to students, until students are able to do the task on their own without teacher assistance. The scaffolded instructional model has been operationalized widely as the "Three Ps" (presentation, practice, and performance) or the "I Do, We Do, You Do" models. These models are applicable across target skills (e.g., emergent literacy, oral language), although they must take into account and be adapted to the local context. For instance, monitoring students' reading and providing corrective feedback, essential components of the "you do" or the 'performance' phases of the scaffolded learning model, are particularly challenging in developing countries due to large class sizes. One way of overcoming this challenge may be monitoring students' reading on a row by row basis (Abadzi & Martelli, 2014).

In many developing countries, teachers have limited or no education in literacy instruction (Akyeampong et al., 2013; Piper & Korda, 2011b; Pryor et al., 2012). In such contexts, scripted lessons and teacher guides may be an important means as well as a starting place for helping teachers to organize content and establish instructional routines for literacy instruction (Piper & Korda, 2011b). Although the vast majority of extant randomized control trials on literacy instruction in developing countries have used scripted lessons, direct evidence on whether scripted lessons are more effective than alternative approaches—the effect of using scripted lessons per se, separate from intervention content itself—is limited. Recent studies, however, indicate their potential effectiveness. In Malawi, teachers found scripted lessons that provide explicit systematic instruction on literacy instruction to be helpful in implementing the lessons and integrating principles of effective literacy instructional practices (Tilson, Kamlongera, Pucilowski, & Nampota, 2013a). In Kenya, student literacy skills were higher in classrooms where teachers were provided with teacher guides (with scripted lesson plans) compared to those who had only student books and teacher training (RTI, 2015a).

When provided, scripted lesson plans and teacher guidebooks should include step-by-step, straightforward instructions in a single volume per semester or year (Piper & Korda, 2011b) and should

not be long or too wordy or complex (Tilson et al., 2013a). Of course, teacher guides and lesson plans are not effective by themselves; rigorous professional development is needed to ensure effective use of scripted lesson plans (Tilson, Allemano, Mereku, & Marfo, 2013b).

Instructional time

Quality teaching requires dedicated instructional time. However, in many developing countries, literacy has not been taught as a subject and consequently no separate time has been set aside for literacy instruction (EDC, 2013). With the teaching of reading and writing folded into the larger "language arts" curriculum in many countries, direct and systematic reading and writing instruction does not happen in sufficient quantity or depth (Bunyi, Cherotich, & Piper, 2013). For instance, in most Arabic-speaking countries, reading is taught under the umbrella of the Arabic language curriculum, often without systematic and organized instruction (Boyle, Al Ajjawi, & Xiang, 2014).

There are also several related factors that limit students' opportunity to learn. In many countries the school day and/or year is relatively short, and double shift schools are prevalent, limiting instructional time (Benavot & Amadio, 2004; Piper & Korda, 2011a,b). In addition, teacher and pupil absenteeism, school closures, and a lack of time on task further limit opportunity to learn. In Mali, actual number of learning days was only 53% of mandated school days (EDC, 2013). In Haiti, schools were closed 27% of the time and student daily attendance rates averaged only 77% (DeStefano & Miksic, 2007). Not surprisingly, lack of opportunity to learn is related to lower literacy achievement. The combination of lost school days and student absenteeism explained 55% of the variation in student performance on reading skills in Haitian Creole (Gilles & Jester Quijada, 2008). In Jordan, strong-performing classes had an average observed absenteeism rate of 6.1%, compared to 14.8% for lower-performing classes (Brombach, Collins, Cummiskey, Kochetkova, & Mulcahy-Dunn, 2012). Similar results were also found in Zambia (Falconer-Stout et al., 2015) and Yemen (Collins & Messaoud-Galusi, 2012).

Although a rough estimate of 850 to 1000 hours per year has been recommended as the minimum instructional time needed in reading over a school year (Gilles & Jester Quijada, 2008), there is no clear evidence from low-income countries about how much instructional time is necessary or sufficient for successful literacy instruction. In the US context, reading and language arts are typically taught for approximately 90 minutes a day in elementary grades (National Science Foundation, 2012). In developing countries, the amount of instructional time devoted to reading varies by intervention or project. For instance, in Jordan, as part of a reading intervention, teachers in Grades 2 and 3 were requested to teach reading at least for 15 minutes per day (RTI, 2014a). In other intervention projects, teachers in treatment schools increased the amount of instructional time devoted to reading instruction (e.g., 40 minutes vs. 25 minutes in comparison in Nigeria, RTI, 2016a; 45 minutes daily in Liberia, Piper & Korda, 2011a, and in Mozambique, Raupp, Newmann, Reves, & Lauchande, 2015; 50 minutes per day in Zambia, Falconer-Stout et al., 2015). In addition to increasing the amount of classroom time devoted to reading, teachers in these intervention classrooms were found to spend the vast majority of that instructional time on literacy skills whereas in control classrooms, much of instructional time was spent on non-literacy and even non-instructional activities (administration, discipline). (RTI, 2016a).

Achieving automaticity

Accuracy in reading (e.g., accurately identifying letters and reading words) is important. However, in addition to accuracy, achieving automaticity and efficiency is important as it allows students to access and retrieve relevant information efficiently to support reading and writing. Achieving automaticity is relevant at all levels of literacy skills, including sublexical emergent literacy skills (e.g., letter naming and letter writing), word reading (word reading fluency) and spelling, and text reading

Automaticity refers to effortlessness and lack of conscious awareness. Automaticity in reading refers to the ability to recognize letters, sounds, and word accurately and immediately upon seeing them without expending attention or effort. Automaticity in a particular construct is typically assessed by timed tasks.

(reading fluency) (Breznitz, 2006; Ehri, 2005; Piper & Zuilkowski, 2016; Saiegh-Haddad, 2005; Wolf, 2001). Practice is key to developing automaticity, and therefore, it is important to build in the time and opportunities to practice taught skills in the instructional routine.

Assessment Considerations

Assessment is an essential component of effective instruction as it provides information about students' achievement levels and reasons for the performance level. There are multiple types and purposes of student assessments such as screening (to identify some students who might be at risk for literacy failure and require further diagnostic assessment), diagnostic (to identify specific areas of strengths and weaknesses), formative and progress monitoring (to reveal whether students are learning adequately), and summative (overall achievement level). All these assessments can be conducted at multiple levels such as classroom, local, national, regional, and international levels (e.g., Learning metrics by UNESCO, 2014).

Assessments should be aligned with theoretical models and empirical evidence for literacy development and with literacy curriculum, meet psychometric standards (i.e., reliability and validity; Sattler, 2001), and meet the needs of developing countries (e.g., language context; Wagner, D. A., 2003, 2011). Most assessments on reading comprehension provide important information about level of performance, but do typically not provide information about the reasons for poor performance. Further or follow-up assessments are needed to determine whether students' poor reading comprehension is due to weakness in either word reading or listening comprehension, as well as their component skills (see the framework and Figure 2 above). One important feature that educators (teachers and evaluators) should be aware is that if assessments are used for comparison across times (e.g., beginning, middle, and end of school year or an intervention), then assessments of the same construct (e.g., reading fluency or comprehension) should be equivalent. For instance, changes in students' performance cannot be accurately measured if difficulty levels of different forms of assessments (e.g., Form A is used at the beginning of a school year and Form B is used at the end of school year) are not equivalent.

Various language and literacy assessments are available in many languages and contexts, generally in the areas of emergent literacy skills (e.g., phonological awareness, letter naming fluency), word reading (word reading and nonword or novel word reading), reading fluency, reading comprehension, and oral language (vocabulary and listening comprehension): EGRA[9] (Early Grade Reading Assessment), developed by the World Bank and USAID, Save the Children's Literacy Boost Assessment,[10] ASER[11] (Annual Status of Education Report) in India and other countries (Banerji, 2016; Vagh, 2016), Uwezo (Nakabugo, 2016), UNICEF's MICS (Multiple Indicator Cluster Survey; Cardoso & Dowd, 2016), EDC's OLA[12] (Out-of-school Literacy Assessment), Young Lives (Cueto & Leon, 2012), UNESCO's LAMP[13] (Literacy

[9] Gove & Wetterberg, 2011 and https://globalreadingnetwork.net/eddata

[10] http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/6931.PDF

[11] http://www.asercentre.org/Keywords/p/205.html

[12] http://eola.edc.org/about/ola-design/

[13] http://www.uis.unesco.org/literacy/Pages/lamp-literacy-assessment.aspx

and Assessment and Monitoring Programme, 2009), and World Vision's Functional Literacy Assessment Tool (FLAT) (see UNESCO Institute of Statistics, 2016 for more details). EGRA has been used in over 100 languages[14] for a variety of purposes such as providing information about baseline, instructional target, a system-wide diagnostic of reading difficulties, and the evaluation of reading programs (Dubeck & Gove, 2015; Dubeck, Gove, & Alexander, 2016; Gove et al., 2015; Gove & Wetterberg, 2011). Use of any of the assessments above require adequate training for reliable administration, scoring, interpretation, and use (see UNESCO Institute of Statistics, 2016 for a comprehensive review of various aspects to consider in reading assessments). Both paper and pencil tests and electronic data collection options are available, depending on the context (see the ICT section below for further details).

Instructional Materials Considerations

Literacy development requires exposure to and practice with written texts. Therefore, access to appropriate reading materials, including textbooks and books for pleasure or for practice and building a culture of reading, is an important issue in many developing countries. A study in Mali reported that across different school types (curriculum, classique and medersas) book possession in class was below the 50% mark and was markedly low in the earlier grades in particular (RTI, 2009b). The most recent EGRA baseline in Mali indicated that 50% of children still do not have textbooks (RTI 2016c). While studies in Arabic-speaking countries indicated that the availability of textbooks was not an issue, a national survey in Jordan in 2012 found that only half of schools had a school library. In Morocco, only 10% of schools in Doukkala Abda reported having a school library (Messaoud-Galus, Mulcahy-Dunn, Ralaingita, & Kochetkova, 2012). Indeed, non-textbook print materials are often lacking, or lacking for developing readers in many contexts. Lack of print materials is even more severe in children's mother tongue or first language. (Neuman & Celano, 2001; Paton-Ash & Wilmot, 2015; Edwards & Ngwaru, 2011).

While provision of materials alone has a small impact on improving student outcomes (McEwan, 2014; Tilson et.al., 2013b), instructional materials are effective when teachers have the necessary knowledge to use them correctly as part of literacy instruction. A recent study in Kenya demonstrated that impact on students' literacy skills was much larger when teachers had student books available, compared to teacher training alone with no instructional materials (RTI, 2015a). Indeed, the development community has ample evidence of the important role that instructional materials and books play (Edwards & Ngwaru, 2011; Elley, 2000; Gilles & Quijada, 2008; Heyneman et al., 1978; Rosenberg, 1998; Tilson et al., 2013b). However, in addition to the availability of reading materials, an important issue is how they are provided to schools and homes, and how the materials are used. For example, a randomized controlled trial in India examining the impact of physical school libraries on pupils' language skills had no effect; and the provision of visiting librarians actually had a negative effect (Borkum et. al. 2013). These results mirror those of Save the Children's locally produced Book Banks. Overall, Book Bank effects were not consistent across studies and contexts for a variety of reasons (research design issues, or null findings). However, its potential is reported in some studies. For instance, in Ethiopia, Literacy Boost program participants who could name their favorite book from the Book Bank had higher literacy scores than those who could not (Gebreaneia et al., 2014). Book Floods, where a significant number of high quality books (about 100 titles per class) are introduced into a system, were effective in the Pacific islands in promoting the activity of reading and improving reading acquisition in the 1970s and 80s (Elley, 2000). They were accompanied by training in how to use the books. Therefore, challenges in developing

[14] Extant EGRA versions are available at https://globalreadingnetwork.net/eddata

countries include how to affordably and sustainably get appropriate books into the hands of children, how to promote borrowing and using books, and how to encourage creating enriched home literacy environments (Borkum, 2013; Elley, 2000; Gebreaneia et al., 2014; Glewwe et al. 2009).

Books and texts provided to schools should be engaging and culturally appropriate. However, in many contexts, poorer schools receive donations of old books, out of date books, or books that are culturally or age inappropriate. (Paton-Ash & Wilmot, 2015). In many African countries, the publishing industry is challenged to produce relevant books for reading in local languages. In most cases the market is simply not lucrative enough to justify publishers' investments (Edwards & Ngwaru, 2011). Publications such as *Writing in Nine Tongues* and the *Catalogue of South African Literature,* however, signal growing awareness of the importance of local language publishing, beyond textbooks. The Rwandan Children's Book Initiative, for example, recently worked directly with local publishers to pilot strategies for increasing the availability of local language children's books. The initiative resulted in the development of forty-seven Kinyarwanda children's books appropriate for Grades 1 to 3. Moreover, interviews with authors, publishers and illustrators trained to develop children's books indicated an increase in their knowledge, skills and even confidence (Malik, Balfour, Nzabonimpa, Cozzolino, Dib, & Dowd, 2015).

There are other initiatives as well to make the creation and distribution of appropriate early grade reading books in mother tongue, local language and/or language of instruction more feasible. Some provide a basic template to create books online, to find culturally appropriate stories, and to translate stories. For example, the African Storybook Project is used in many countries, with digital readers that can be adapted to different languages and contexts. Save the Children uses a Book Bank model to provide Literacy Boost schools with locally developed reading materials for the early grades (Save the Children, 2012). Pratham's low-cost books and literacy instructional materials are likewise widely used in India. The South African Book Development Council actively encourages local publishing to foster a culture of reading. The Global Book Fund Alliance has looked at supply chain issues as well as publishing and distribution issues across nations in order to find solutions to the book shortages. These initiatives are all designed, using different strategies, to address the critical shortage of culturally and linguistically appropriate reading materials for early grade learners.[15] Finally, the Norwegian Development Agency (NORAD), the UK Department for International Development (DFID) and the US Agency for International Development (USAID) funded a global book fund feasibility study examining whether such a mechanism could transform the situation of low availability of textbooks and reading books in low income countries by improving the effectiveness of book chains, from publishing to purchasing to delivery and dissemination (Results for Development, 2016). In particular, the study examined the potential use of models from the health sector and concluded that there are lessons to be learned, although the direct use of such models, applied to the book problem, is not recommended. The report further highlighted that the climate at the governmental level is not yet as propitious as it was for, say vaccinations, as the need for books, especially those in mother tongue languages, has not yet been actively adopted by governments (Results for Development, 2016).

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[15] Information on these particular initiatives can be found at the following sites: African Storybook Project: http://my.africanstorybook.org

Literacy Boost: http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/6931.PDF Pratham: http://prathamusa.org or http://pratham.org for Pratham India

South African Book Development Council: http://sabookcouncil.co.za

Global Book Fund Alliance: https://www.usaid.gov/sites/default/files/documents/1865/GlobalBookFund_Two_Pager.pdf

School infrastructure environments in low-income countries vary considerably. In some contexts, instruction occurs outdoors and there are no walls available to display print or instructional materials. In other contexts, there are few instructional materials to support learning and it is often necessary for teachers, school directors, and even parents to tap into creative and non-traditional methods to create or procure instructional materials. For example, the Madrasa Resource Center program in Kenya, Zanzibar and Uganda focused on training Madrasa Resource Center pre-school teachers to use locally available materials to stimulate children's interest in exploring and experimenting. Children in Madrasa Resource Center classrooms where pre-school teachers were trained to use these materials in a child-centered way scored higher on assessments of cognitive development than children in the control group (Malmberg et al., 2011). Likewise, the Rwanda Children's Book Initiative reported that training teachers on how to use locally-produced children's books in the classroom (albeit from trained professional local publishers) resulted in increased reading frequency both inside and outside the classroom, as well as a concomitant increase in the richness and variety of locally made materials (i.e. by teachers and students) inside the classroom (Malik, et al., 2015). Teachers generally used the books in their lessons and also allowed children to select books for independent reading. Additionally, significantly higher percentage of teachers in the Rwandan Children's Book Initiative encouraged students to read at home than those in the business-as-usual condition.

ICT Considerations

ICTs are often very attractive to policymakers, parents, teachers and school directors, as they connote an advanced educational system and well-resourced schools. The research is quite clear, however, that ICT components should be aligned with pedagogy (Trucano, 2005). In other words, if the underlying approach to literacy instruction is weak, it is unlikely that a limited, standalone intervention with a mobile phone, computer, or e-reader will produce significant change. For example, in the One Laptop per Child program in Peru, the software on the laptops was not tailored to the curriculum and teachers did not generally change their instructional approaches when the computers were introduced (Cristia, Ibarrarán, Cueto, Santiago, & Severín, 2012; Villarán, 2010). Not surprisingly, an evaluation of the program found no statistically significant improvements in achievement (Beuermann, Cristia, Cueto, Malamud, & Cruz-Aguayo, 2015). This evidence suggests that ICT alone is not a silver bullet—ICT applications must be built upon the foundation of a high-quality, evidence-based literacy instruction curriculum.

The evidence for in-school, early-grade-reading focused ICT programs in developing countries remains relatively sparse (Trucano, 2005; Wagner, D. A., 2014). In Kenya, one large study compared the effects of three ICT interventions—student e-readers, teacher tablets with lesson plans and support materials, and instructional coach tablets, all layered on top of the same literacy program—on second-grade student reading outcomes in English and Kiswahili (Piper, Zuilkowski, Kwayumba, & Strigel, 2016). While all three interventions were effective in comparison with a control group, there were no additional benefits of the more ICT-intensive and expensive approaches—the student e-readers and teacher tablets—over the version that equipped only the zone-level instructional coaches with tablets. Other studies in Kenya (Abrami, Wade, Lysenko, Marsch, & Gioko, 2014) and Ghana (Jaffe, Lowe, & Mahesri, 2012) have found some positive effects using computers and student e-readers, respectively. Radio instruction has had a longer history, and evidence from Mali, Zambia, Sudan, and elsewhere suggests that this approach can be effective, particularly in reaching rural areas (EDC, 2013; 2014b). We will discuss specific interventions in greater detail as relevant in each section of the report.

ICT devices and content must be targeted for the contexts in which they will be used and the people who will use them (Wagner, D. A., Castillo, Murphy,

Crofton, & Zahra, 2014). In general, programs employing ICTs need to use devices that are durable in developing country contexts and contain relevant, age and culturally appropriate material. A tablet that is considered sturdy in the United States may not be a feasible option in extreme environments—high temperatures, dust, and unstable electricity, for example. In rural sub-Saharan Africa the electrification rate is just 17% (International Energy Agency, 2015), making devices that must be charged regularly a poor fit to the context. In Ghana, Worldreader has reduced e-reader breakage rates in its programs in sub-Saharan Africa dramatically by working both with manufacturers to source reinforced screens and with local stakeholders—students, teachers, and parents—to improve care of the devices (Tam, 2012). Despite their potential for assisting in the instruction of students with disabilities (UNESCO, 2013), a recent review did not find any ICT literacy programs that were specifically designed to meet the needs of this population (Wagner, D. A. et al., 2014).

Program planners should not make assumptions about teachers' ability to use ICT devices (Pouezevara & Khan, 2008) and should ensure that technical support is available (Chigona, Chigona, & Davids, 2014). Extensive training is often necessary, beginning with how to turn on devices and log in. In settings where teachers are unfamiliar with devices, teachers need time to build their own skills before they can support others. Skipping this step may lead to unused devices gathering dust rather than being used as intended, as teachers who are uncomfortable with new technology may simply ignore it (Chigona & Chigona, 2010). School systems that currently do not use ICT approaches intensively should therefore move forward in stages, allowing teachers to become more familiar with technology over time before expanding to students. Beginning with technology that is widely available and relatively inexpensive such as mobile phones and text messaging is both more feasible financially and less intimidating to teachers.

Providing Ongoing Support for Teachers and Schools

Literacy instruction in the early grades is generally embedded within schools, and therefore, efficient management of schools, including involvement of principals and professionalism of teachers, enables effective literacy instruction (EDC, 2013; Spratt et al., 2013; Raupp et al., 2015). In Rwanda, schools receiving books on time and making use of learning materials had higher achievement (EDC, 2016). In Mozambique, explicit reading instruction was implemented in two contexts—one with attention to reading component skills and the other with reading component skills and school management. After a year of instruction, students in the reading instruction with school management condition achieved higher reading skills (Raupp et al., 2015; also see Chapter 4 for more information on teacher in-service professional development and coaching).

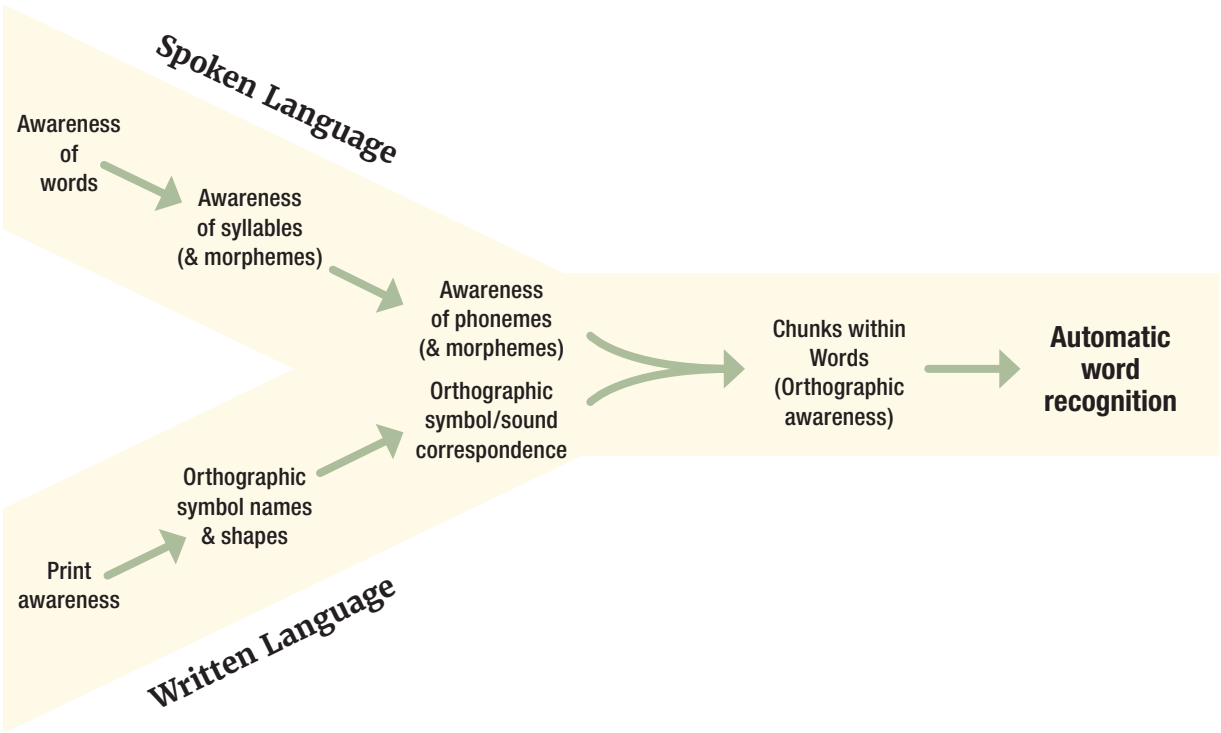
Chapter 3. Key Areas to Successfully Promote Improved Early Grade Literacy Skills: By Areas

Section A. Emergent Literacy Skills: Foundations for Word Reading and Spelling

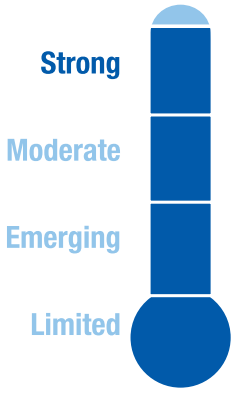
Background: What and Why Emergent Literacy Skills?

Emergent literacy skills are foundational for word reading and spelling (see Figure 2 in Section A) and typically include print awareness, orthographic symbol knowledge, phonological awareness, orthographic awareness, and morphological awareness. **Print awareness** is knowledge of how print works and how it is different from other symbols such as pictures. **Orthographic symbol knowledge** is knowledge of shapes, names, and sounds of orthographic symbols such as alphabet letters. **Orthographic awareness** refers to the ability to "visually recognize legal letter patterns and sequences in printed words" (Kim, 2011, p. 179). **Phonological awareness** is the ability to recognize and manipulate various sizes of speech sounds (e.g., words, syllables, and phonemes; Stanovich, 1992). **Morphological awareness** is sensitivity to word structure and ability to manipulate morphemes (smallest unit of meaning; Carlisle, 1995), and is

Figure 4. Language and print-related skills that contribute to word reading and spelling



particularly helpful for multisyllabic word reading and spelling in languages with different writing systems (Abu-Rabia, 2007; Cho, McBride-Chang, & Park, 2008; McBride-Chang et al., 2008; Taha & Saiegh-Haddad, in press). As shown in Figure 4, the student's journey to reading starts by learning to map orthographic symbols to sounds, and progresses to accurately sounding out words and to fluently reading them.



Evidence from Developing Countries

The evidence base for the importance of explicit and systematic instruction on emergent literacy skills is strong in developing country contexts. The positive effect of systematically teaching orthographic symbol-sound relations (i.e., phonological awareness, orthographic symbol knowledge, and phonics[16]) has been clearly demonstrated in low-income countries (Crouch, Korda, & Mumo, 2009*;[17] Davidson & Hobbs, 2013*; DeStefano, Slade, & Korda, 2013*; Dixon, Schagen, & Seedhouse, 2011; EDC, 2013*, 2014; Dunlop, 2015*; Falconer-Stout, Messner, & Wedekind, 2015*; Mitton, 2008*; Gebreanenia, Sorissa, Takele, Yenew, & Garjardo, 2014*; Karki & Dowd, 2013*; Mungoi, Mandlante, Nhatubve, Mahanggue, Fonseca, & Dowd, 2010*; Nag-Arulmani, Reddy, Buckley, 2003; Pinto, 2010*; Piper, Jepkemei, & Kibukho, 2015; Piper & Korda, 2011a; Piper, Jepkemi, & Kibukho, 2015; Pallante & Kim, 2013; Plessis, El-Ashry, & Tietjen, 2016*; Pouezevara, Costello, & Banda, 2013; Raupp, Newmann, Reves, & Lauchande, 2015*; Rolla San Francisco, Arias, Villers, & Snow, 2006; RTI, 2014a,b*, 2015a, 2015b*, 2016a; Save the Children, 2013*; Sahin, 2006*; Spratt, King, & Bulat, 2013; Wagner, D. A., & Spratt, 1987; Wagner, D. A., Spratt, & Ezzaki, 1989; World Bank, 2016*). For instance, Nag-Arulmani and her colleagues (2003) provided an intervention in phonological skills to 7- to 9-year olds with reading difficulties in India. Those who received interventions improved word reading and spelling to a greater extent than those who did not, and the intervention was particularly helpful for students with very low initial word reading skills. Effect sizes in these studies ranged from small[18] to large (e.g., 1.23; RTI, 2015a). Furthermore, a study in Yemen showed cumulative effects such that students who received explicit and systematic instruction for two years improved reading to a larger extent than those who received instruction for one year (Pleiss et al., 2016).

Although highly encouraging, no significant impact were observed in many contexts including Afganistan (Azami & Pava, 2014*), Burundi (Rosenkranz, Jonason, & Kajangwa, 2014*), El Salvador (Pisani & Alvarado, 2014*), Indonesia (Guajardo, Hossain, Nath, & Dowd, 2013*; Pisasni, Satyaning, Giri, Alesbury, & de Fretes, 2014*), Pakistan (Moulvi, Pisani, Dowd, Burki, & Mithani, 2014*; Moulvi & Pava, 2014*), Philippines (Badiable, Guardo, & Robism 2013*), Sri Lanka (Wickramasekara, Navaratnam, & Guajardo, 2014*), and Uganda (Guajardo et al., 2013*). Therefore, further understanding is needed about factors influencing results. In addition, the majority of these studies targeted multiple components beyond emergent literacy skills, and therefore, specific effects of each emergent literacy skill components on reading often cannot be teased out.

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[16] Phonics refers to an instructional approach where the relation between orthographic symbols and sounds is explicitly taught (Adams, 1990).

[17] Studies with an * indicate that effect sizes could not be verified due to insufficient information (e.g., standard deviation).

[18] Quite a few studies did not report effect sizes.

Table 2. Evidence-based principles for instruction of emergent literacy skills

Emergent literacy skill	General principle	Considering variation across languages and writing systems
Print awareness	Teach directionality of text and features of print. When reading books, point to each word (print referencing) so that students develop an understanding that print represents sounds. Create print-rich environment where orthographic symbols and other print (e.g., chart, student work) are displayed and books are available in an organized manner (see Fisher, Godwin, & Seltman, 2014 for a negative effect of too much print in the classroom).	Directionality relevant to the target writing system should be explicitly taught. In Arabic, written text is read from right to left and from top row to the next row. In English, written text is read from left to right and from top row to the next row. In traditional Chinese texts, text is read from top to bottom and right to left (text is read by column).
Orthographic symbol knowledge	Teach shapes, names, and sounds of orthographic symbols together. In many languages, symbol names contain clues to sounds, which need to be explicitly taught. Allot additional time for teaching visually complex orthographic symbols and do not introduce visually similar orthographic symbols together as they cause confusion.	Some writing systems have greater number of orthographic symbols than others (e.g., Hindi; Nag, Chiat, Torgeson, & Snowling, 2014), or visually similar symbols (e.g., Hebrew and Arabic; Treiman, Levin, & Kessler, 2007; Levin, Saiegh-Haddad, Hende, & Ziv, 2008), or highly visually complex orthographic symbols (e.g., Chinese; Huang & Hanley, 1997; Zhou, McBride-Chang, & Wong, 2014; Akshara used in India, Nag, 2007).
Orthographic awareness	Start with individual orthographic symbol-sound patterns, followed by a short string of orthographic symbols (e.g., 'at' pattern found in *cat, hat, pat, that*). Then, introduce more complex letter groups (e.g., *-ing, -igh*).	Instruction should clearly lay out consistent and inconsistent relations and teach them using appropriate instructional approaches. For example, in English, symbol-sound relations are explicitly taught for the vast majority of words while for some irregular words, whole word instruction is used.
Phonological awareness	Manipulating larger phonological units such as syllables is easier than small units such as phonemes. When teaching phoneme awareness, identifying initial and ending phonemes is easier than identifying medial sounds. Phonological awareness activities vary in difficulty. Identifying an odd sound[19] is easiest, followed by blending and segmenting sounds. Deleting sounds is the most difficult type of activity. Therefore, initial instruction should progress from a larger phonological unit (e.g., syllables) to a smaller unit, using easier tasks (e.g., blending) in the beginning and then moving to more demanding tasks (e.g., deletion).	Languages differ in salient phonological units (Kim, 2007; Share & Blum, 2005; Saiegh-Haddad, 2007; Ziegler & Goswami, 2005) and in the units of sounds that link to orthographic symbols (English letters represent phonemes; fidels in Ethiopia represent syllables; Akshara in India represent syllables and phonemes; Nag et al.2014). In languages where symbols represent phonemes, phonological awareness instruction should ultimately target phoneme awareness in addition to other units such as syllables. In languages where symbols represent syllables, instruction targeting syllable awareness may suffice (Tilson et al., 2013a). Students in diglossic contexts need instruction on literary or standard names and pronunciations (Abadzi & Martelli, 2014).
Morphological awareness	Teach children how to recognize morphemes in a word in oral language, and then recognize them in written words (e.g., Apel & Diehm, in press). For instance, *unpredictable* is composed of three morphemes, un, predict, able; *flowers* is composed of two morphemes, flower and s (plural).	Morphological structures vary across languages. In some languages, free morphemes are prominent (e.g., Chinese, and West African languages) whereas in others words are made up of both free and bound morphemes[20] (e.g., Bantu languages, Turkish). Instruction should be aligned with prominent morphological structures in the target language.

[19] In an oddity task, students hear a set of words such as "sun, sock, and top." In this set, "top" is the odd word because it starts with /t/ phoneme whereas /s/ is the initial phoneme in the other two words. In blending tasks, phonemes such as /k/ /a/ /t/ are blended to a word, /kat/ cat. In segmenting tasks, /kat/ can can be segmented into /k/ /a/ /t/. In deletion tasks, when /k/ sound is deleted from /kat/, only /at/ is left.

[20] Bound morphemes are those that cannot stand alone and therefore have to be attached to the base word (e.g., -(e)s for plural or affixes such as pre- in English) whereas free morphemes are those that can be a stand alone word (e.g., horse in horsemen).

Summary of Important Design Considerations and Challenges

- **Teach emergent literacy skills explicitly and systematically, considering characteristics of language and writing systems**

  Systematic instruction refers to instruction in the appropriate scope and sequence (from easy to difficult skills and activities). Table 2 shows guidelines and principles of instruction in emergent literacy skills in general as well as factors to consider to reflect characteristics of language and writing systems.

- **Progress from high-frequency single syllable words to multisyllabic words.**

  Initial phonics instruction should focus on one-syllable, easy to decode words to teach the basics of decoding. Initially, teachers should use one-syllable words that students are familiar with in oral language (e.g., at, cat, bag). Once students can sound out a few simple words, decodable books or texts can be used for further practice in connected texts. When students can read single syllable words with accuracy, teachers need to teach them, explicitly, how to read multisyllabic words. The basic idea in teaching multisyllabic words is to break down words into manageable units such as syllables or morphemes. As an example, teachers can display the word cowboy on the board, point at the cow part of the word and read it. The teacher can then point to the boy part of the word and read it. Finally, the teacher can blend cow and boy as cowboy by sweeping the finger across the word.

- **Teach word reading in conjunction with spelling.**

  Word reading should be taught in conjunction with spelling. Word reading and spelling draw on the same emergent literacy skills, and facilitate each other (Ehri, 2000; Kim, 2011). Some teachers in developing countries hold a view that reading should be taught before spelling because students might "mix reading and writing" (EDC, 2014a, p. 40). Teaching word reading and spelling simultaneously is theoretically sound because spelling reinforces the symbol-sound knowledge and relations (Weiser & Mathes, 2011) and also empirically validated. For instance, in the Democratic Republic of Congo, students whose teachers integrated reading and spelling (e.g., read and write the words that contain target letters) had higher achievement in reading (EDC, 2014a).

Decodable books contain words that the students have learned to decode. For instance, if one-syllable words such as hat, cat, bag, pig have been taught, then the decodable texts would contain these and other already taught words.

Consideration of Environmental Characteristics and Resources

Phonological awareness is recognizing sounds in words, and therefore, does not require print materials. However, the other aspects of emergent literacy—print awareness and orthographic symbol knowledge—do require the presence of text and the means to write and display letters and words. Learning aids have to suit the context and they do not need to be expensive. An example of a set of durable, portable and inexpensive teaching and learning aids is UNICEF's School in a Box.[21] UNICEF's School-in-a-Box kits are often distributed in crisis and conflict situations and their pros and cons have been well debated. However, this model of packaging resources for classrooms or schools can be replicated in many contexts, using locally available materials and the contents can be tailored to focus on supporting emergent literacy skills. For instance, students must see or be exposed to print to learn

[21] http://www.unicef.org/supply/files/School_in_a_box_guidelines.pdf

A Print Rich Classroom in a Resource-Lean Environment

In outdoor schools, where there is a lack of pencils and paper, students can draw letters with sticks in the dirt or sand around them. While not ideal, there are strategies to ensure that children, no matter the environment, have some opportunity to learn orthographic symbol knowledge. Additionally, teachers can reach out to parents and communities to contribute things like bottle caps, small blocks of wood, scrap paper, on which they can write letters to use in teaching (demonstration) as well as to have children manipulate. Bottle caps, wood, shells are items that are found almost everywhere and they are durable as learning aids for children to manipulate.

to read and educators must sometimes be creative in ensuring students see print (e.g., using Bible or Qur'an available in the community). Kits can include things like chalkboard paint, chalk, letter cards, letter blocks, slates, alphabet charts, and a canvas on which to hang materials. Chalkboards are useful for writing letters and words and even full texts; walls are extremely useful to display all sorts of learning aids. In the absence of walls, a canvas with some hooks can also be hung from a suitable tree, and used to display posters, maps, calendars, letters, and words (Tilson et al., 2013a for Ndith Kuwrenga Readers; see also Literacy Boost[22]). Slates for pupils are useful for formative assessment as the teacher can circulate to check what students have written down. With all of these innovative ideas to get materials into classrooms, training for teachers or facilitators and supervision are required to ensure the materials are used as intended (e.g., although useful, the School in a Box is reported not to be widely used in some contexts.[23])

Assessment Considerations

Phonological awareness can be assessed using the same instructional activities described above. For instance, blending or segmenting tasks can be used targeting various phonological units (e.g., syllable awareness or phoneme awareness). Orthographic symbol knowledge can be assessed by randomly ordering orthographic symbols, and asking the student to identify their names and sounds. Timed tasks can be used to assess automaticity. For example, students can be assessed on the number of orthographic symbols they can name within a minute in a task where orthographic symbols are repeatedly presented in a random order. Useful assessment toolkits and videos are available for EGRA and ASER in many languages at globalreadingnetwork.net/eddata and asercentre.org respectively.

ICT Considerations

ICT approaches can be used for various instructional activities, and many studies noted in this report included ICTs applications to support the development of literacy skills. For example, projects such as the READ-TA project in Ethiopia have included brief instructional videos on teacher tablets that scaffold the instruction of letter sounds, an approach which may be particularly useful in contexts where teachers are teaching in a language in which they are not fully fluent. These videos can be used by teachers as a review, or directly with students. Student devices, as

[22] http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/BEYOND_SCHOOL_WALLS_LITERACY_BOOST_2013.PDF

[23] See, for example, The Use of Emergency Education and Recreational Kits in Aceh: A Review at http://www.alnap.org/pool/files/the-use-of-emergency-education-and-recreation-kits-in-aceh.pdf

used by Worldreader in Ghana, can also support print awareness by providing access to a wide range of text materials and encouraging pleasure reading. In South Africa, the Bridges to the Future Initiative uses tablets to display recorded literacy lessons in four languages for children in grades one through three (Wagner, D. A., 2014). As teacher's ability with new technologies increases in developing countries, the possibilities for further use of student-focused applications to support phonological and morphological awareness will grow.

Research Gaps

Compared to other areas of literacy skills, there is relatively solid empirical evidence on approaches to improve word reading. However, because the vast majority of studies were multi-component interventions (targeting phonological awareness, phonics, vocabulary, reading fluency, and reading comprehension), our understanding is limited about the overlapping and unique contributions of various emergent literacy skills to word reading. Furthermore, as previous studies primarily focused on phonological awareness and phonics, little is understood about the roles of orthographic awareness and morphological awareness in word reading, particularly in multisyllabic word reading. Also remaining is a question about instructional dosage—how much time and intensity is necessary and sufficient to promote word reading skills in different contexts. Finally, better understanding is needed regarding the instructional approaches most effective and suitable for large classroom environments, which is prevalent in developing countries.

Illustrative Example on Emergent Literacy Skills Instruction

The following is an example of a scope and sequence to teach emergent literacy skills in PRIMR (Primary Math and Reading) in Kenya (see Piper, Jepkemi, & Kibukho, 2015; RTI, 2015a for further details and results). Target grades were students in Grade 1. Note that exemplars are provided in English for illustrative purposes and do not necessarily indicate a need to provide instruction in a second language.

Table 3. Example of scope and sequence of emergent literacy skills instruction

	Day 1	Day 2	Day 3	Day 4	Day 5
Phonological awareness	Sound recognition of /m/	Oral reading of /m/	Sound recognition of /m/ /a/	Oral blending of /a/ /m/	Oral blending of /a/ /m/
Letter sounds	m	m	M, a	M, m, A, a	M, m, A, a
Word reading				am	am

Sample Daily Lesson

Day 1 Phonological awareness

(T = Teacher; S = Student)

T: We are going to practice our English sounds today. First, we will say the sound. Then, I will say words one at a time and you will tell me whether or not the word begins with the sound.

I do – Step 1

T: The sound is /**m**/.

T: The first word is, **mat**. The word begins with /**m**/ so I show thumbs up.

T: The next word is **at**. The word does not begin with /**m**/, so I show thumbs down.

We do – Step 2

T: Let's try it together. The sound is /**m**/. What is the sound?

T & S: /**m**/.

T: Now I will say a word. If it begins with /**m**/, show thumbs up. If it does not, thumbs down.

T: First word is **mat**.

T & S: Respond together.

Continue with examples: **at**.

You do – Step 3

T: Now you try. The sound is /**m**/.

T: Show thumbs up if the word begins with /**m**/. If not, thumbs down.

T: First word is **mat**.

S: Thumbs up.

Continue with examples: ***at, make, mother, cook, jam, market, bread, meat****.*

Day 1 Naming Letters and Sounds

I do – Step 1

*Put the small letter **m** on the blackboard/pocket chart. Point to the letter and say,*

T: The name of this letter is m. This is the small letter **m**.

T: The sound of this letter is the same in English and Kiswahili. The sound is /**m**/.

T: I will write the letter while I say the sound.

We do – Step 2

T: Let's do it together. The name of this letter is?

T & S: **m**.

T: The sound of this letter is?

T & S: /**m**/.

You do – Step 3

T: Now you do it alone. The name of this letter is?

S: **m**.

T: The sound of this letter is?

S: /**m**/.

T: Open your book to page 31. Point to the small letter **m** on the page.

Day 3 Word Reading

I do – Step 1

Put the word am on the blackboard/pocket chart.

T: Watch me: /**a**/ /**m**/.

T: The word is **am**.

We do – Step 2

T: Now, we shall do it together. We shall say the sounds, then we shall say the whole word.

T & S: /**a**/ /**m**/.

T: The word is…

T & S: **am**.

You do – Step 3

T: Now you try it.

T: (Sweep your finger under the letters as the students say.)

S: /**a**/ /**m**/.

T: The word is …

S: **am**.

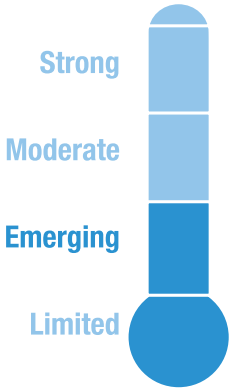
Section B. Oral Language Skills: Foundations for Reading Comprehension

Background: What and Why Oral Language Skills?

Oral language is a broad construct encompassing various aspects such as phonology, morphology, vocabulary, syntax, grammar, and discourse (Kim, 2016a). As reading and writing are language represented in print, these various aspects of oral language skills are necessary for reading and writing development. For reading comprehension, language skills such as vocabulary, grammatical knowledge, and listening comprehension are particularly relevant (del Valle Catalan, 2016; Gough & Tunmer, 1986; Juel, Griffith, & Gough, 1986; Kim, Al Otaiba, Folsom, & Greulich, 2011; Kim, Al Otaiba, Sidler, Greulich, & Puranik, 2014). As illustrated in Figure 2, reading comprehension cannot be achieved without language comprehension skills even with proficient word reading. Despite its clear evidence, the importance of oral language is often not recognized by teachers in some texts (e.g., Friedlander, Gasana, & Goldenberg, 2014).

Discourse-level oral language skills such as listening comprehension are higher-order skills (Kim, 2015, 2016a; see Figure 3) and built on lower-level oral language skills such as vocabulary and grammatical knowledge as well as a complex array of cognitive skills, including working memory, inhibitory control, attention, inference, perspective taking and reasoning, and comprehension monitoring as well as background knowledge (Florit, et al., 2014; Kendeou, et al., 2008; Kim, 2015, 2016a; Kim & Phillips, 2014; Lepola, et al., 2012; Tompkins, et al., 2014). These skills develop when children are exposed to rich oral language at home and school. Children need to hear words, sentences, and stories frequently and need to engage in meaningful, rich language experiences to develop their oral language skills (Hart & Risley, 1995; Wells, 1986).

Oral language proficiency is not just a concern for children acquiring in multilingual contexts or L2. Instead, children differ largely in their oral language proficiency in L1 (e.g., vocabulary), and therefore, should be explicitly and systematically taught in both L1 and L2.



Evidence from Developing Countries

Emerging evidence in developing countries suggests that instructional attention to oral language improves reading skills. In the Democratic Republic of Congo, teachers' instruction in French on vocabulary (e.g., discussing illustrations and new vocabulary) was associated with improved reading (EDC, 2014). Furthermore, students who were exposed to spoken 'literary' Arabic—the language used in reading and academic contexts—during preschool had higher performance in reading comprehension in Grades 1 and 2 than those who were exposed only to the spoken Arabic dialect—the language used in the home (Abu-Rabia, 2000; Feitelson, Goldstein, Iraqi, & Share, 1993). Spoken Arabic used in the home is differs from literary Arabic in several ways, some of which can impact literacy acquisition (Abu-Rabia, 2000).

However, evidence about the effect of multi-component intervention on students' oral language is mixed,[24] with results ranging from no effect to large effects. No effects were found in multicomponent

[24] In many studies, students' listening comprehension was measured by a single story or passage followed by 5 questions. This is limiting, given passage effect and the limited number of items. As noted below, greater attention is needed to accurately and reliably measure students' listening comprehension ability.

interventions in Afghanistan (Azami & Pava, 2014*), Bangladesh (Guajardo, Hossain, Nath, & Dowd, 2013*), Ethiopia (Friedlander, et al., 2012*; Gebreanenia, Sorissa, Takele, Yenew, & Garjardo, 2014*), Haiti (RTI, 2015b*; Save the Children, 2013*), Malawi (Pouezevara et al., 2013), Mali (Spratt et al., 2013), Nepal (Pinto, 2010*), Philippines (Badiable et al., 2013*; Dunlop, 2015*), and Zambia (Falconer-Stout et al., 2015*).

Other studies found positive effects, but effect sizes varied widely. Small effects were found in the ApaL program in Mozambique, which provided 45 minutes of daily multicomponent instruction in Portuguese for children in Grades 2 and 3. Students in the treatment condition outperformed those in the control condition in vocabulary and simple sentence comprehension in Portuguese, the language of instruction (Raupp, Newmann, Reves, & Lauchande, 2015*). Similarly, a positive, but small effect was found on listening comprehension in Indonesia (Brown, 2013*), Jordan (RTI, 2014a*), Nigeria (RTI, 2016a), Papua New Guinea (World Bank, 2016*), and Yemen (Plessis et al., 2016*). On the other hand, moderate effects were found for students in Kiswahili in rural Kenya (RTI, 2015a), and large effects were found in Liberia (DeStefano et al., 2013*), especially for students who received intervention with a school management reinforcement (Piper & Korda, 2011a).

The large variability across studies might be attributed to many factors, including language of instruction (whether instruction was in students' L1 or L2), nature of oral language instruction and assessment, and the extent to which oral language instruction was implemented. When it comes to the nature of oral language instruction, unfortunately, many reports did not provide details about instructional approaches and intensity, and therefore, it is difficult to accurately gauge differences across intervention projects.

Furthermore, in some studies, oral language tasks were not equated in difficulty such that task difficulty might have masked a potential intervention effect to some extent (e.g., too difficult at endline assessment; Spratt et al., 2013). Finally, fidelity of implementation is an important factor. For instance, in Zambia, although the intervention included oral language instruction, classroom observation revealed little actual instruction on oral language (Falconer-Stout, et al., 2015).

One approach that has received initial evidence for improving oral language in low-income countries is book reading (Bekman, Aksu-Koc, & Erguvanli-Taylan, 2011; Ntuli & Pretorius, 2005*). In particular, dialogic reading, an interactive book reading approach with a focus on oral language development (e.g., Whitehurst, Arnold, Epstein, Angell, Smith, & Fischel, 1994; Hargrave & Senechal, 2000), had a large effect on children's vocabulary for children in Bangladeshi (Opel, Ameer, & Aboud, 2009). In dialogic reading, the teacher reads a book multiple times to students, asks and prompts students with questions about target vocabulary and content of the text, and engages students in conversations and discussions during and after reading.[26]

Summary of Important Design Considerations and Challenges

- **Explicitly teach oral language both in L1 and L2 contexts.**

  Oral language instruction does not have to wait until students develop reading skills, either for students acquiring literacy skills in L1 or L2. Instead, oral language such as vocabulary should be taught explicitly as early as possible—children differ greatly in their vocabulary knowledge even in L1. Vocabulary instruction should include providing opportunities for multiple exposures to words, student-friendly definitions and

[25] Language of instruction in the vast majority of these studies was L2 with exceptions of Falconer-Stout et al. (2015), RTI (2015a—Language of instruction in this study varied depending on the condition), and RTI (2016a).

[26] See http://www.readingrockets.org/article/dialogic-reading-effective-way-read-preschoolers

explanations,[27] and opportunities to engage in deep processing of the words (e.g., multiple meanings of a word; Graves, 2006). Teachers should choose words that are used frequently across contexts (or subjects)—words that are not too easy (e.g., baby) or too difficult or specific to a certain subject (e.g., isotope), but are important in multiple domains (e.g., comfort; Beck, McKeown, Kucan, 2002). In multilingual contexts where students are learning in L2, basic words have to be explicitly taught. In addition, understanding morphemes in a new word can provide clues to the meaning of the word (e.g., the meaning of *friendliness* can be inferred if the student knows that it is composed of friend+li+ness). Exposure to oral language and instruction in oral language should be provided throughout the day across subject areas and grade levels.

Utilize book reading as an important source to promote oral language instruction.

Book reading can be a highly effective tool, when implemented properly, in improving children's oral language and knowledge building because (1) books typically contain more sophisticated language than daily conversations or TV and therefore, book reading provides important opportunities for students to be exposed to sophisticated language (Hayes & Ahrens, 1988); (2) books show language (vocabulary and expression) used in context, which is particularly helpful when the teacher is not proficient in the language of instruction;[28] and (3) books provide content which helps children develop background knowledge. When reading books to students, book reading should not be limited to simply reading written texts. Instead, selected target vocabulary should be directly taught, various questions should be asked, including what (e.g., what is this?), where (e.g., where is this story happening?), when (e.g., when did the event occur?), why (e.g., why are the characters doing something?), and how (e.g., how did the characters do it?) questions. Dialogic reading is one evidence-based approach to improve oral language in low income countries (Opel et al., 2009). In order for it to be implemented across low-income countries, the availability of and access to quality books would have to be substantially increased (see Malik et al., 2015). The Rwanda Children's Book Initiative is an example of one program that increased the availability of high quality local language reading books for children in Grades 1 to 3. Teachers who had access to these books significantly increased the amount of time they devoted to reading storybooks aloud compared to control schools. They also explicitly asked their students to read more and encouraged them to select books from the classroom collection to take home to read (Malik et al., 2015).

Increase language learning opportunities by using E^3 strategy. (Expose, Elicit, and Extend; Kim & Yun, in press[29])

One of the most important ways to learn a language is to be exposed to good language models—students need to hear quality language being used every day. Teachers should use rich vocabulary and expressions. Language is learned through using it. Teachers should elicit students' responses by asking different types of open-ended questions—asking students to label objects, recall

[27] Dictionary definitions are often too difficult for students. Student-friendly definitions and explanations involves using common language that students are likely to be familiar. For instance, a dictionary definition of 'ally' (noun) is "a person, group… that is associated with another or other for some common cause." When using student-friendly terms, an ally can be described as "someone who helps you in what you are trying to do, especially when there are other people who are against you," (Beck et al., p. 36).

[28] Though building teachers' own language proficiency may be an important requisite to promoting student's literacy acquisition (see Chapter 4). Building teachers' language proficiency is, however, a long term process. Over the short or medium term, having teachers read books to children can be an important tool for improving oral language proficiency.

[29] This recommendation is from a review of studies in developed country contexts for young children. However, the principle should apply to developing countries as well.

Example Use of E³ Strategy

Teacher: *Tell me about what you are making.* (Elicitation)

Student: *A tree.*

Teacher: *You are making a tree with trunk and leaves.* (Extension and Exposure—'trunk' and 'leaves')

Student: *Yes, I like my tree.*

Teacher: *I love it too. It is a great tree with strong trunk and vibrant leaves.* (Extension and Exposure 'vibrant')

information explicitly stated in conversations or books, and infer information that is not explicitly stated in conversations or books. Extending students' utterances is also an important way to continue multi-turn conversations and provide language input (e.g., Dickinson & Proche, 2011; Justice, Mashburn, Pence, & Wiggins, 2008).

- **Teach cognitively demanding questions to promote higher-order thinking skills.**

  Inferencing is inferring meaning that is not explicitly stated in the texts (oral or written texts). Comprehension monitoring is the ability to think about and evaluate one's own comprehension (Kim, 2016a). When students hear inconsistent information or a story that does not make sense, some students are better at detecting the inconsistency than others (Kim, 2015, 2016). To promote inferencing and comprehension monitoring, teachers should ask "why" questions when telling or reading stories (e.g., why did the character do that? Does the character's behavior make sense? Why or why not?). As is the case with other aspects of oral language, inferencing and comprehension monitoring should begin as early as possible, before students can read.

Consideration of Environmental Characteristics and Resources

In order to use books and text materials as a means to promote oral language (e.g., dialogic reading), high quality books and text materials are necessary. There are some examples of the successful and low cost production of local text materials. Madrasa Resource Center preschools in Uganda, Kenya and Zanzibar, where teachers were trained to use low-cost, locally available materials in a child-centered way, had a positive impact on children's cognitive development, in comparison to a control group (Malmberg, Mwaura, & Synva, 2011). Books produced by local publishers can be too expensive for widespread use, resulting in low demand and a weak supply chain (Edwards & Ngwaru, 201; Kruger, 2009). However, the Rwanda Children's Book Initiative, working with local authors, publishers and illustrators did prove to be effective in increasing the supply of books in Kinyarwanda for early grades by about 33% (Malik et al., 2015), thereby creating more avenues to expose children to oral language through read-alouds and book reading. The Initiative worked with publishers, authors and illustrators to build their capacity in the children's book publishing industry, while simultaneously working with teachers to increase their knowledge and skills in using book reading in classrooms. A similar project in Malawi involved community members in making books and these books, which are culturally relevant and appropriate (FHI360, 2014).

In addition to the use of locally made and culturally appropriate books, there are also international initiatives to supply books to classrooms around the world. For example, the educational publisher Scolastic is known for creating classroom libraries in a variety of languages (Arabic, English, French, Spanish) on nonfiction topics like plants, animals, dinosaurs, the universe, etc. that can be used across many cultures. Room to Read's libraries and high quality books include decodable stories as well as leveled books.

Illustrative Example: Dialogic Reading

In dialogic reading, teachers and parents do not simply read words in the book. Instead, teachers ask various "wh" questions before, during, and after reading to promote students' active participation (e.g., paying attention to stories and texts, and asking and responding to questions).

Book selection: Select books that are age and culturally appropriate, interesting, and contain useful words to teach/useful ideas to think about/knowledge to acquire and have some illustrations. If the book does not contain illustrations for target words, picture cards can be used or teachers can draw on the blackboard (Opel et al., 2009).

Procedures: Books are read multiple times throughout the week. Each time, the book is read, different types of questions are asked. During the first reading, a few "what" questions are asked. During each additional reading of the same book, other questions (how, why) are asked and children are encouraged to be more actively engaged in the conversation.

During the first reading, "what" questions are asked while pointing to illustrations such as *"What is that?" "What is he doing?"* The teacher evaluates the student's response (Yes, that is a soccer ball) while enunciating and stressing the new words, soccer ball. Then, all the children repeat the new words (Everyone say 'soccer ball'). The teacher asks more questions about the illustration such as *"What is the color of the soccer ball?" "Who uses a soccer ball?" "What do you do with a soccer ball?"* More challenging questions are open-ended questions. Examples include *"What do you see here?" "What else do you see?" "What is happening here?" "Can you tell me more about the soccer ball?"*

During additional readings, the teacher asks higher-order questions that refer to the story plot and to the student's personal experiences. Examples included *"What did he do next?" "Why was he happy?" "What happened in the beginning?" "Did you ever see _____?" "Where was it?" "What did it do?"* When responding to the students' answers, the teacher expands each child's response by repeating back some part of what the student said, but adding more (e.g., *"He is kicking the soccer ball during a game."*). The teacher also encourages the student's participation and longer responses and descriptions. Prompting is one way to invite the students to participate (e.g., The boy is kicking_____.).

Assessment Considerations

In order to evaluate students' needs for oral language instruction, carefully designed language assessments should be used. For instance, EGRA listening comprehension assessment in developing countries asks children to listen to a story and then answer 5 related questions. This is limiting in many aspects such as psychometrics (e.g., a single story and associated 5 questions is not sufficient to provide reliable and valid information). Furthermore, this format is not sufficient to capture variation in children's ability in oral language comprehension. For instance, although students might score a zero in a listening comprehension task (listening to passages), they may be able to understand some words or sentences. A well-constructed oral language assessment would assess children's comprehension at the word (vocabulary), sentence (sentence comprehension), and discourse (listening comprehension) level, using both receptive and expressive tasks. In receptive tasks, students primarily hear vocabulary, sentences, and stories and identify correct responses. Expressive tasks require students to produce oral language (e.g., vocabulary, sentence, and stories). Finally, listening comprehension assessments at the discourse level should carefully consider balancing literal and inferential questions. Literal comprehension questions require students identify information that is explicitly stated in the given text whereas inferential comprehension questions require students to infer information that is not explicitly stated (Kim & Petscher, in press).

ICT Considerations

While there is little evidence of effective ICT usage for the promotion of oral language skills specifically, e-readers and mobile phones can be used to provide wide access to electronic books and text materials in a variety of languages, as discussed further in sections 4a below. Software could also be designed to read text aloud to children, enhancing their oral language development.

Research Gaps

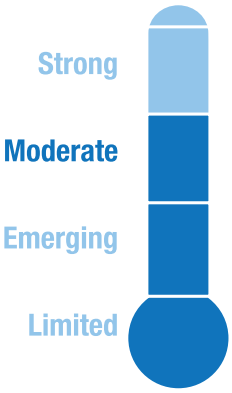
Evidence is sparse about effective approaches to promote oral language skills (see Chapter 4 for the latter). It is a grave mistake to consider the importance of oral language proficiency only in the context of literacy acquisition in L2. Studies have consistently shown that students vary widely in oral language proficiency in their L1 and the language of instruction (e.g., Falconer-Stout et al., 2015; Piper et al., 2015; RTI, 2015a, b; 2016). Research evidence is needed to examine what instructional approaches are effective to improve children's oral language in what contexts. In particular, we need more information and evidence about what kind of language comprehension curriculum is simple enough for teachers to implement on a daily basis, yet powerful enough to make a difference in oral language, and subsequently in reading comprehension and writing. Furthermore, there is a great need to develop a richer set of reliable and valid tools for measuring children's oral language skills such as vocabulary, sentence comprehension, and discourse-level comprehension (i.e., listening comprehension).

Section C. Reading Fluency: Foundation for Reading Comprehension

Background: What and Why Reading Fluency?

Reading fluency refers to the accurate and rapid reading of connected text with expression (reading prosody (NICHD, 2000). Reading fluency, also widely referred to as oral reading fluency or text reading fluency, is a text level, not a lexical (word) level, skill, and is strongly related to reading comprehension across languages (del Valle Catalan, 2016; Fuchs, Fuchs, Hosp, & Jenkins, 2001; Hudson, Pullen, Lane, & Torgesen, 2009; Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003; Kim, 2015; Kim, Park, & Wagner, R. K., 2014; Kim, Petscher, Schatschneider, & Foorman, 2010; Piper & Korda, 2011a; Pouezevara

et al., 2013). Reading fluency promotes reading comprehension by allowing attention and working memory to be used for comprehension processes rather than decoding (Jenkins et al., 2003; Kim, 2015; Kim & Wagner, R. K., 2015; LaBerge & Samuels, 1974). Although reading fluency has received much attention in developing countries and it is important to assess reading fluency, reading fluency itself is not an end goal of reading instruction. As one of the experts interviewed for this report put it: "We all know that we get quick results with decoding. But decoding is not reading. We need to put a lot more emphasis on comprehension." Indeed, reading fluency is important because of its role in reading comprehension.



Evidence from Developing Countries

There is a moderate evidence base that explicit instruction on multiple components improves students' reading fluency. In studies explicitly focused on the big 5 identified by the National Reading Panel Report (NICHD, 2000; phonological awareness, phonics, vocabulary, reading fluency, and reading comprehension), students were able to read connected text more accurately and rapidly in various L1 and L2 contexts such as Bangladesh (Jonason et al., 2014*[30]), the Democratic Republic of Congo (EDC, 2014a), Ethiopia (Friedlander et al., 2012*; Gebreanenia et al., 2014*), Indonesia (Brown, 2013*), Jordan (RTI, 2014a), Kenya (Piper, Jepkemi, & Kibukho, 2015; RTI, 2014b*, 2015a), Liberia (DeStefano et al., 2013*; Piper & Korda, 2011a), Mali (Spratt et al., 2013), Malawai (Pouezevara et al., 2013), Mozambique (Mungoi et al., 2010*; Raupp, Newmann, Reves, & Lauchande, 2015*), Nigeria (RTI, 2016a), Papua New Guinea (World Bank, 2016*[31]), Philippines (Dunlop, 2015*), Sri Lanka (Wickramasekara et al., 2014), and Zambia (Falconer-Stout, Messner, & Wedekind, 2015*). However, effect sizes varied largely from small (e.g., .14, Brown, 2013*) to large (.73, Piper & Korda, 2011a).

Other studies, on the other hand, produced no discernable effects in reading fluency (Azami & Pava, 2014*; Badiable et al., 2013*; Guajardo, 2012*; Karki & Dowd, 2013*; Moulvi et al., 2012*; Moulvi & Pava, 2014*; Pisani & Alvarado, 2014*; Pisani et al., 2014; Rosenkranz et al., 2014*; RTI 2015b*).

Summary of Important Design Considerations and Challenges

- **Build in instructional time and opportunities for text reading.**

  Automaticity in reading does not develop automatically. When students can start decoding words accurately, opportunities to practice reading approximate texts (i.e., instruction level or just slightly challenging texts; Kuhn & Stahl, 2003) should be explicitly built in the reading curriculum. Teachers should include time to reread the words taught in isolation or in connected texts. Students need daily practice reading the same texts several times, with attention to accuracy and speed (repeated reading).

- **Model fluent reading.**

  Students need to hear and internalize fluent reading (Rasinski, Homan, & Biggs, 2009). Teachers should demonstrate reading with accuracy, at a conversational rate, and with expression (pausing and varying pitch at appropriate places).

[30] Description of language context was not explicitly provided in some documents, and thus, the authors' best judgement was used inferring from documents.

[31] The report did not provide results by language or grade.

Repeated reading in a large class can be implemented in the order of **echo reading, choral reading, partner reading, and whisper reading** (Brooker et al., 2010). In **echo reading,** the teacher reads clauses or sentences and the students repeat after the teacher. In **choral reading,** the teacher and students read the same texts together. In **partner reading,** students are paired and take turns reading. In **whisper reading,** students are asked to read the same text to themselves in a quiet voice that has been practiced through echo reading, choral reading, and partner reading. Across all the readings, students should be encouraged to point to the text using their finger, and teachers should walk around the class monitoring students' reading. When pairing students for partner reading, fluent readers should be paired with less fluent students.

Consideration of Environmental Characteristics and Resources

For the purpose of practicing reading fluency with timed repeated reading, relatively short passages are useful so that students can finish the passage within a reasonable time. Texts for repeated reading should be either at the instructional level (students can read 95% of the words independently) or slightly challenging (students can read 90% of the words independently) (Kuhn & Stahl, 2003). Supporting the development of reading fluency in print-poor environments is challenging in part due to the lack of texts to read. In these instances, teachers can use local songs, poems, proverbs and short folk tales written on a chalkboard to give students the opportunity to practice reading fluency. It is important, however, to make sure that children are reading, not just memorizing.

Assessment Considerations

EGRA and other similar assessment batteries include reading fluency tasks. When developing and using reading fluency tasks, texts used for reading fluency assessments should be grade and age appropriate (see RTI, 2016b for EGRA tool kit). In addition, multiple passages should be used because texts vary in difficulty and text difficulty is an important factor for determining reading fluency. Even very carefully developed texts that have equivalent readability values can result in significantly different text reading fluency (rate) among children (Francis et al., 2008; Petscher & Kim, 2011). To account for the passage effect, an ideal approach is equating passages in terms of reading rate. An alternative, widely-used approach, however, has been using multiple texts (e.g., 3 passages) and using either the mean or median (middle) scores (see the Dynamic Indicators of Basic Early Literacy Skills [DIBELS] approach; Petscher & Kim, 2011).

ICT Considerations

Empirical evidence examining the use of ICT approaches to improve reading fluency is limited. A study in Kenya, discussed in greater detail in section 3b above, did not find additional benefit to more ICT-intensive interventions in terms of reading fluency outcomes (Piper, Zuilkowski, Kwayumba, & Strigel, 2016). A number of possible applications of ICTs to improve reading fluency exist, however. When students have e-readers, tablets, or mobile phones, they can be given a range of texts with which to practice reading. Devices can also time students as they read, and allow for the easy gathering of data on progress over time, which is a challenge in large classrooms. Teachers may be able to use software such as Tangerine to collect student fluency data and examine class-level trends. However, such approaches are not feasible in all settings, as they require a relatively high level of technical skill among teachers as well as centralized infrastructure and support.

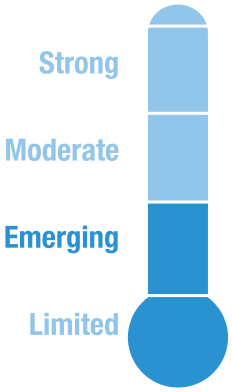
Research Gaps

Reading fluency is widely assessed as a measure of reading proficiency in developing countries, and has been shown to be related to reading comprehension in developing countries in L2 contexts (Draper & Spaull, 2013; Piper & Korda, 2011a). The wide use and focus on reading fluency in assessment and instruction in developing countries assumes it has the same mediating role in developing countries that it has in high-income countries (Kim, 2015; Kim & Wagner, R. K., 2015; Kim, Park, & Wagner, R. K., 2014). However, empirical examination of the mediating role of reading fluency from developing countries and various orthographies has been limited. For instance, in some writing systems (e.g., Thai & Khmer) word boundaries are not visually marked and the development of reading fluency in these writing systems would be informative. Furthermore, many developing countries have developed reading fluency benchmarks. Although benchmarks are useful for monitoring progress and are set in different ways (e.g., using normative information about reading trajectory data or a desired rate of progress), the normative performance level itself is a moving target. In many low-income countries, students were not able to read any words in connected texts (i.e., zero score in reading fluency) at baseline (e.g., EDC, 2013; Falconer-Stout et al., 2015; Piper, 2010b; RTI, 2016a), but improve their reading skills with evidence-based instruction. It is important, then, that benchmarks are continuously evaluated or adjusted as more empirical data become available. It is also important to reiterate here that improvement in reading fluency itself is not the end goal, but an important skill to improving reading comprehension. Finally, although reading fluency assessments including benchmarks provide useful information, reading fluency should be used as one of the several indicators of reading proficiency.

Section D. Reading Comprehension

Background: What is Reading Comprehension and Why is it Important?

Reading comprehension is "the process of extracting and constructing meaning through interaction and involvement with written language" (RAND study group, 2002, p. 11), and is the ultimate goal of reading. As shown in previous sections, reading comprehension draws on both word reading (decoding printed words) and listening comprehension (understanding meaning), and complex processes on which each of these draw (see Figure 2). Therefore, without appropriate development and coordination of these multiple processes, reading comprehension cannot be achieved.



Evidence from Developing Countries

The evidence on approaches that facilitate reading comprehension in developing country contexts is emerging. In contrast to relatively consistent effects on building-block reading skills such as decoding and reading fluency, interventions have yielded limited impact or mixed results in reading comprehension skills. Many studies in L1 and/or L2 found no effect in reading comprehension (Azami & Pava, 2014*; Badiable et al., 2013*; Dunlop, 2015*; Friedlander et al., 2012*; Guajardo et al., 2012*, 2013*; Jonason et al., 2014*; Karki & Dowd, 2013*; Moulvi et al., 2014*; Moulvi & Pava, 2014*; Mungoi et al., 2010*; Pallante & Kim, 2013; Pinto, 2010*; Pisani & Alvarado, 2012*; Pisani et al., 2014*; Rosenkranz et al., 2014*; Wickramasekara et al., 2014*). For instance, in Haiti, children were provided multicomponent reading instruction in Haitian Creole for a year, but this yielded no effect on reading comprehension for students in Grades 1 and 2 (RTI, 2015b).

When positive effects were found, most of them were small or varied. Small effects were found in Ethiopia (Gebreanenia et al., 2014), Haiti (Save the Children, 2013), Indonesia (Brown, 2013*), Jordan (RTI, 2014a), Kenya (RTI, 2014b*, RTI, 2015a), Malawai (Pouezevara et al., 2013), Mozambique (Raupp et al., 2015*), and Zambia (Falconer-Stout et al., 2015*). Varying effects were reported for students in different grades: Effect sizes ranged from .05 to .58 for students in Grades 1 and 2 in Kenya (Piper et al., 2015); a positive effect for students in Grade 4 but not in Grade 2 in Malawi (Dowd & Mabeti, 2011*); and inconsistent results across grades 1, 2, and 3 in Mali (Spratt et al., 2013).

Exceptions were a few studies where moderate to large effect sizes were found—Liberia (DeStefano et al., 2013*; Piper & Korda, 2011a[32]), Nigeria (RTI, 2016a), and Papua New Guinea (World Bank, 2016*). In the study in Liberia, students were assigned to control, light treatment, and full treatment conditions. Children in the control condition did not receive multi-component systematic instruction whereas children in the full treatment condition received reading instruction and teachers were supported with instructional materials, training, and coaching. Parents and communities were also informed of students' performance. The light treatment condition consisted of parents and community being informed of student performance, but without direct instruction in reading. Results showed consistently that children in the full treatment condition outperformed those in the control and light treatment condition. There was practically no difference between control versus light treatment condition.

Summary of Important Design Considerations and Challenges

■ Ensure solid foundations in word reading and listening comprehension.

Proficiency in word reading and listening comprehension is necessary for reading comprehension—both are necessary and one cannot compensate for the other (see Figure 2). Therefore, for children who are struggling with reading comprehension, whether the child's struggle is due to word reading and/or listening comprehension should be determined, followed by systematic instruction on the identified areas. Many of the reviewed studies reported little to weak effects on listening comprehension, compared to word reading (see Sections B and C). Therefore, a logical next step is to expand our understanding about effective instructional approaches to improve oral language proficiency (see Section C), and consequently reading comprehension. This applies to literacy acquisition in both L1 and L2 contexts.

■ Directly teach reading comprehension strategies. (Shanahan et al., 2010)

Reading comprehension strategies include questioning, visualization, text structure (how information is presented), summarizing, and retelling. Teachers should ask what, when, where, why, and how questions, and encourage students to raise questions as they read texts. Teachers should verbally express their own comprehension processes as they read passages. For instance, when the teacher reads a sentence that does not make sense, the teacher pauses and says, "This part does not make sense to me. Let me reread this sentence."

■ Secure daily designated and extended time for literacy instruction.

Instructional time needs to be allotted for teaching reading comprehension and for students actually to engage in reading. Because reading comprehension draws on a host of skills such as word reading and listening comprehension as well as language and cognitive skills that support word reading and listening comprehension, development of reading comprehension takes prolonged time. However, classroom observation studies for students in Grades 2 and 3 in Zambia (Falconer-Stout, 2015) as well as those in Grade 2 in Nigeria (RTI,

[32] Only for full implementation condition, but not for light condition.

2016a) revealed that only a small proportion of instructional time was spent on teaching reading comprehension than teaching word reading and related emergent literacy skills (Falconer-Stout, 2015). For example, teachers in a treatment group in Nigeria spent, on average, 2.4 to 4.8 minutes on vocabulary and comprehension instruction out of a total of 45 minutes of reading instruction (RTI, 2016a).

Consider language and cultural characteristics

One way to promote reading comprehension is raising questions while reading texts. However, cultures vary in terms of raising questions about content presented by perceived authority figures such as authors (e.g., Dixon, Graber, & Brooks-Gunn, 2008; Iyengar & Lepper, 1999). In this context, it is important to inform students about the purpose of the questioning strategy—to better comprehend the author's intended meaning. Furthermore, cultural variation should be taken into consideration for text structure instruction. Different cultures develop their own ways of presenting stories and information, and it is critical that teachers and educators analyze texts to determine how texts are structured in their specific cultural contexts (Heath, 1983). Studies in the US have shown that reading comprehension suffers when texts do not follow expected structures (Baker & Stein, 1981).

Consideration of Environmental Characteristics and Resources

The "Book Flood" approach in Niue, Fiji, Singapore, Sri Lanka, South Africa, the Solomon Islands and other countries consisted of "flooding" about 100 high interest books per classroom into resource poor environments (Elley, 2000). Results from different contexts suggested that the effect of the presence of books alone was negligible. Instead, when accompanied by simple training for teachers, children spent more time reading (Elley & Mangubhai, 1983; Hafiz & Tudor, 1989) and achieved higher reading skills than those in control schools (Elley, 2000). Pratham's Story Weaver (an online, open source site to develop books) and the Children's Book Project for Tanzania are additional examples of efforts to expand the supply of engaging and appropriate books for children, to support a culture of reading. In contrast, the Improving Quality of Primary Education Program in Ethiopia did not result in increased EGRA scores (Kraft & Epstein, 2014). This might be because although the Improving Quality of Primary Education Program provided mother tongue supplementary storybooks, mobile library shelves, slates, alphabet sorts, chalk and stationary to school-based reading centers, there were still too many students per class and too few actual teaching and learning materials to have an impact. These studies indicate that although availability of suitable books is critical and necessary to promoting reading development other factors such as class size and student to book ratios can impede comprehension and frustrate these efforts.

Strategies employed to sustain progress in ensuring all children have access to books include: 1) the development of national book policies, 2) the establishment of a Children's Book Forum to network book development professionals and raise awareness of the importance of books, and 3) the formation of a purchasing consortium to increase economies of scale, especially for government book purchasing in the future. However, it will take more time to determine if supply chain and demand issues have been addressed such that local book production sustainably increases supply. Finally, donor groups such as USAID, the Norwegian Ministry of Foreign Affairs, UKAID and the Global Partnership for Education are supporting the development of a Global Book Fund Alliance. The goal of the Global Book Fund Alliance is to transform the development, procurement and distribution of books, leveraging financing strategies built on experience from the health sector to lower costs while increasing distribution and quality.

Assessment Considerations

Typical reading comprehension assessment informs us about students' performance levels. However, important for instructional purposes is information about why students performs at a particularly level. Therefore, in addition to reading comprehension, assessment on word reading (including reading fluency) and oral language proficiency should be conducted. Extant studies have been highly uniform in the format of reading comprehension assessment—asking children to read a passage and then asking five comprehension questions. This is limiting in many aspects, including the fact that the children are generally only asked to read one passage and answer a single set of questions. This has implications for reliability and validity (see above for similar issues for listening comprehension assessment in Section C). In addition, these tasks may not be sensitive enough to accurately capture reading comprehension for students with low reading proficiency. For instance, a sentence-level reading comprehension task (e.g., the student hears a sentence and identify veracity of the statement) might be able to capture students' emerging reading comprehension more accurately for students with low reading proficiency.

Illustrative Example: Reading Comprehension Strategy Instruction

The following activity, Thinker's Spinner, contributed by Save the Children, is designed to promote use of reading comprehension strategies (see above).

Create a spinner out of a paper plate or card stock. Divide and label the spinner into four segments: predict, explain, summarize, and evaluate.

When first using the spinner, explain each thinking task and demonstrate each task in the context of a story or text just read.

Predict: What do you think will happen next? What do you think will happen five years from now?

Explain: What are the different steps in this process? What are the causes behind this event?

Summarize: What were the main characters? Where did the story happen? What were the main events in the story? What is the author's main idea? What are some ideas used to support the main idea?

Evaluate: Do you think the author used good evidence or argument to support the main idea? Why or why not? What do you like/not like about the story and why?

Use the spinner to ensure a variety in the types of questions students get to respond to about a given text.

ICT Considerations

ICT applications for literacy offer numerous possibilities for enhancing and assessing comprehension. For example, students reading a text on an e-reader, mobile phone, or tablet could answer a series of on-screen comprehension questions. The multilingual Bridges to the Future software, used in South Africa, uses a game approach to test children's comprehension of reading material (Wagner, D. A., 2014). Using software such as Tangerine (Kipp, Strigel, & Pouezevara, 2016), student responses could be collected by teachers for quick assessment of reading comprehension, even in a large class. In Tangerine, teachers can build assessments aimed at the specific skills their students are working on, and observe changes over time. However, despite the existence of such applications, teacher usage in developing countries is often limited due to lack of comfort and faculty with the technology and lack of the facilities, infrastructure, and staff to support its use in this manner.

Research Gaps

Much of the extant research in low-income countries consists of randomized evaluations of multicomponent interventions. Although this approach is highly informative and might make sense for cost-effectiveness purposes, more fine-grained information is necessary. As reviewed above, there is large variation in the multi-component intervention effects, ranging from no effect to a large effect on reading comprehension. However, it is unclear what explains such large variation. Therefore, systematic efforts are needed to elucidate factors that contribute to differential effects and the conditions under which literacy interventions do or do not work. Studies have shown that the literacy achievement levels of multicomponent interventions vary by location (urban, rural), school types, gender, language backgrounds, and socio-economic backgrounds (Falconer-Stout et al., 2015; Piper et al., 2015; Raupp et al., 2015). Additionally, intervention effects may vary as a function of students' initial skill levels and desired instructional approaches and dosage (intensity) that meet students' varying needs—for students at different developmental levels (e.g., for students in the initial phase of development), greater intensity on decoding might pay off whereas for students beyond the initial phase, increased intensity in oral language would be more beneficial. Evidence about feasible and effective instructional approaches to differentiated instruction is also needed.

Section E. Writing for Meaning

Background: What is Writing for Meaning and Why is it Important?

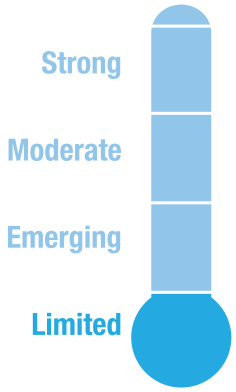
Writing is producing texts in print at sublexical (e.g., writing orthographic symbols), lexical (spelling words), and discourse levels (writing sentences and paragraphs, also called written composition). Written composition refers to the ability to express one's ideas in written texts in a coherent and organized manner, and is one of the most challenging learning tasks. As such, written composition takes years to develop and goes through various phases (Kellogg, 2008). Written composition occurs in various genres including narrative and informational texts. Writing is an increasingly critical skill in daily lives including developing countries. Also, although evidence is not available from developing countries, evidence from the US indicates that writing development has a positive effect on reading development (see a review by Graham & Hebert, 2010). Therefore, writing instruction should be an integral part of early literacy instruction.

What Does it Take to Develop Writing?

Early writing develops in phases from scribbling and drawing, writing strings of orthographic symbols, writing simple words to complex words, sentences, and passages. Figure 5 presents these skills necessary to develop written composition, and the structural relations among skills. Written composition depends on students' transcription

skills (spelling and handwriting) and expressive oral language (Berninger et al., 2002; Juel, Griffith, & Gough, 1986; Kim et al., 2011, 2015; Kim & Schatschneider, in press), both of which, in turn, rely on a complex set of language and cognitive skills (Kim & Schatschneider in press). For written composition, students need to develop proficiency in transcription skills and text generation. Transcription skills include spelling and handwriting (McCutchen, 2000). Spelling skills rely on development of the emergent literacy skills, and require an explicit and systematic instruction (see Chapter 2 Section B). Written composition also requires generation of ideas on a given topic. Therefore, oral language skills as well as background knowledge are essential because generated ideas cannot be expressed without using words, phrases, and sentences (Berninger et al., 2002; Kim et al., 2011, 2014, 2015; Kim & Schatschneider, in press).

Evidence from Developing Countries



Evidence is extremely limited. Even the few extant studies were about emergent writing (i.e., copying; Falconer-Stout et al., 2015) and spelling (RTI, 2016a; Taha & Saiegh-Haddad, in press) with virtually no studies on written composition. Classroom observations in Nigeria revealed time spent on writing instruction (handwriting and spelling) was extremely limited, ranging from 1.6 minutes to 4.5 minutes (RTI, 2016a). Despite this, with a multicomponent intervention, Grade 2 students' letter writing and spelling improved with a small effect (RTI, 2014a) and moderate effects (RTI, 2016a). In Taha and Saiegh-Haddad's (in press) study, elementary grade Arabic readers were provided instruction on phonological awareness and morphological awareness, and their spelling skills improved compared to students who did not receive instruction in phonological awareness and morphological awareness. The development of morphological awareness was particularly effective for poor readers in Grades 4 and 6. Furthermore, there was a transfer effect of phonological and morphological awareness such that the development of phonological awareness facilitated the development of morphological awareness and vice versa. Although these studies are promising, there is a dire need for research in written composition in developing country environments across different writing systems (e.g., what factors influence writing development, what are effective instructional approaches).

Invented spelling is the student's best guess or attempt, but incorrect spelling of a target word, utilizing his or her knowledge of phonology, orthography, and morphology of the language. For example, DRD for dirty is a good, but incorrect attempt, using phonetic and letter knowledge. The student used letter sound knowledge for /d/ and /r/ sounds. The syllable final /d/ is also a reasonable attempt because –ty sounds very close to name of the letter *d*.

Summary of Important Design Considerations and Challenges

■ Explicitly teach transcription skills (handwriting and spelling).

Handwriting instruction should include how to hold a pencil or chalk for efficient writing, guided practice about how to write orthographic symbols from memory (e.g., see Berninger et al., 1997). Systematic spelling instruction should progress from one-syllable words to multisyllabic words with attention to orthographic symbol knowledge, phonological awareness, morphological awareness, and orthographic awareness (Berninger et al., 1998; Graham, Harris, & Chorzempa, 2002; Taha & Saiegh-Haddad, in press; Wanzek et al., 2006). Importantly, in systematic spelling instruction, words for spelling instruction should be carefully selected by considering patterns of words (e.g.,

Figure 5. Component skills of writing and their relations based on the model (in Kim & Schatschneider, in press)

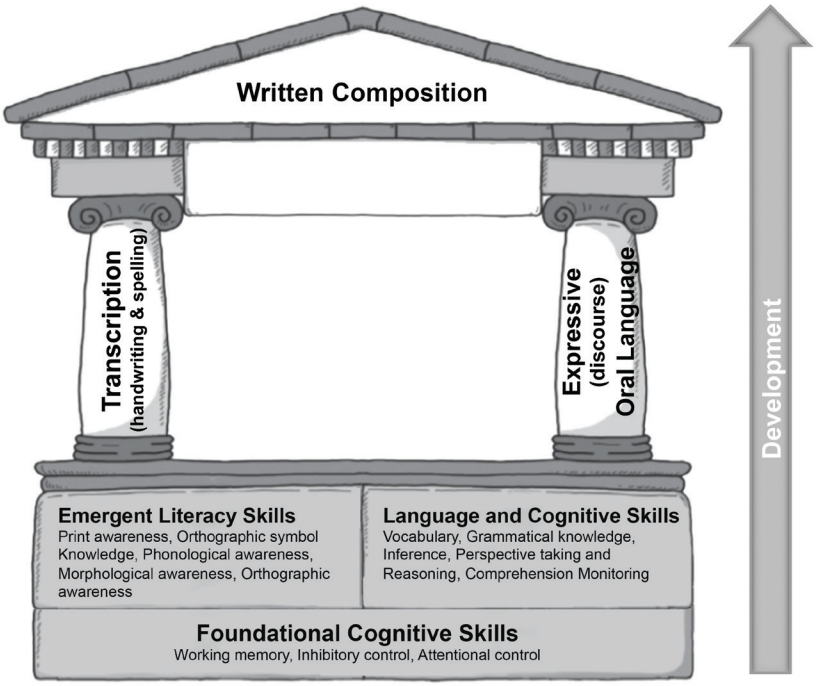
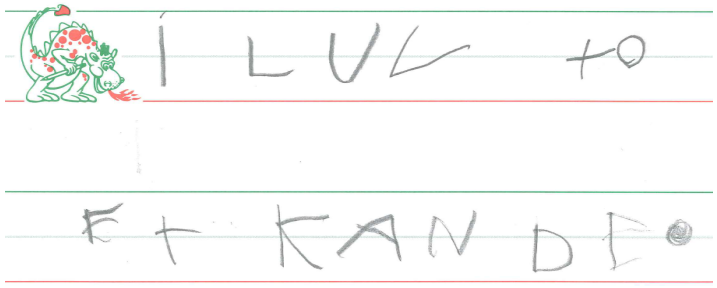


Figure 6. An example of emergent writing (I love to eat candy)



words that have the same pattern or principle; e.g., *cat, pat, bat, mat* contain *at*).

Beginning spellers across writing systems should be encouraged to attempt their best spelling, called invented spelling. In contrast to the widely-held belief in many developing countries that students should not be allowed to make mistakes in spelling (EDC, 2014a), evidence is robust that invented spelling facilitates reading and spelling development by drawing students' attention to sequence of sounds and their connection to orthographic symbols (Frith, 1985; McBride-Chang, 1998; Senechal, Ouellette, Pagan, & Lever, 2012). In the Democratic Republic of Congo, teachers' corrective feedback in invented spelling was related to students' improved reading performance (EDC, 2014a).

■ Teach writing for meaning (written composition), not just copying, as soon as students can start representing sounds using orthographic symbols.

Many teachers in developing countries believe that it is not appropriate for children to write until they can write properly (typically in Grade 4 and beyond, EDC, 2013*, 2014a). However, sentence and paragraph writing should not wait until students develop conventional spelling skills. When students can write using invented spelling, they should be given daily opportunities to write in sentences for authentic purposes. For instance, Figure 6 is a sentence written by a four-year old child using invented spelling.[31] Although this child's spelling is not conventionally accurate yet, by using invented spelling, she has learned that writing is a means of expressing her thought in print, and actively practiced sound-symbol associations.

■ Secure time for daily writing, integrated with reading and other subject areas.

Writing should be taught on its own and also integrated with reading instruction across all subjects and content areas. This increases opportunities to practice writing and also promotes authentic writing for different purposes and content areas.

[31] One approach to promote writing for beginning writers is the interactive writing approach (see Roth & Guinee, 2011)

- **Model how to express ideas using various vocabulary words and sentences (Graham et al., 2012).**

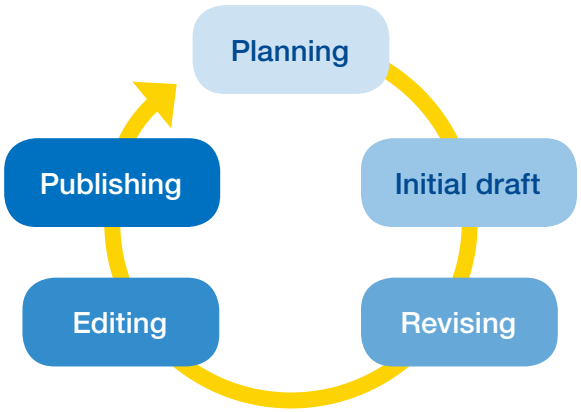
  Teachers should model how to use interesting and precise vocabulary words in writing for authentic purposes. For example, the teacher can demonstrate writing a letter, memo, or stories. During writing, instead of *nice*, the teacher might use *fascinating*, *excellent*, *stupendous*, *gorgeous*, *delightful*, and *pleasant*, depending on the context. Teachers can demonstrate word choice by describing their thinking process (e.g., "I am going to use the word, *delightful*, instead of *nice* because it is a more interesting word). Teachers may display frequently used, sophisticated words on the word wall or the class may have 'a word bank' which lists synonyms and antonyms of high frequency words so that students can use them up during various processes of writing.

  Teachers should also model how to compose sentences that express intended meaning accurately. Teachers can start with simple sentences and progress toward more complex ones. Sentence expansion and sentence combining are useful activities. For example, the two sentences, "My brother is tall. My brother is fast." can be combined to *My brother is tall and fast.* This can be also combined with "He won the race" and expanded to *My tall and fast brother won the race.* Instruction on combining sentences should be integrated into writing, and should not be an isolated drill (e.g., using worksheets). Teachers can demonstrate and model the process of combining and modifying sentences during various processes of writing such as drafting and revising.

- **Demonstrate how to use multiple writing strategies during various phases of writing process (Graham et al., 2012).**

  Writing involves an iterative process of various phases including planning (what to say and how to say the content), drafting (initial, first draft), revising (making changes), editing (changes in writing conventions such as punctuation), and publishing (sharing) (see Figure 7). Good writers typically do not follow this sequence linearly or spend the same amount of time in each process. Instead, they go forward or backward depending on needs. Different writing strategies are relevant and useful in each phase of writing. For instance, during the planning phase, students need to select and organize ideas. During the drafting process, students need to find ways to express ideas using precise vocabulary and sentences, and appropriate text structures (see Graham, 2006, Graham et al., 2012; Harris, Graham, Mason, & Fridlander, 2008; Limpo & Alves, in press for further research-validated writing strategies). During revision process, students revise their writing, paying attention to expressions, organizations, and others' feedback. Then, the composition is read with a focus on spelling and punctuation and writing conventions (i.e., editing). Finally, finished product is shared with peers in the class, school, and community.

Figure 7. Iterative writing process



Consideration of Environmental Characteristics and Resources

Writing for meaning and various purposes is not a commonly taught activity in schools in developing countries. In addition, materials to write on are often scarce. Even workbooks for children are generally reused from year to year, and students jot down answers in their own copy books if they have them. In fact, disposable materials are generally

frowned upon as not cost effective. Some options to mitigate the cost of new workbooks for writing every year include having students write down their own stories or having older grade students make books with stories for lower grade students. This sort of practice with writing—for expression and not for form—is critical. Story Weaver, from Pratham Books, and the African Storybook Project, offer opportunities for nascent writers (including students) to write their own stories. However, the online interface that both programs demand could be an obstacle to getting students to write in contexts where electricity and internet connectivity are an issue.

Assessment Considerations

Spelling is typically assessed through dictation tasks. An important aspect of spelling assessment is the analysis of spelling errors—whether student's misspelling is due to lack of phonological, orthographic, or morphological understanding. Careful examination of spelling errors reveals much information about what students know, and know but confuse (e.g., see spelling error analysis in Arabic, Abu-Rabia & Taha, 2006), and instruction should target areas that students know but confuse (see Bear, Invernizzi, Templeton, & Johnson, 2012). In general, spelling words with consistent sound-symbol correspondences on the syllable initial and final position develops first, followed by medial vowels, and then words with inconsistent sound-symbol correspondences.

Written composition is typically assessed by asking students to write about a given topic or prompt, which may or may not accompany illustrations or reading materials (writing after gathering information from the assigned reading). Compared to reading, evaluation of writing (written composition) is relatively more complex, and there are multiple approaches[34] (Espin, Weissenburger, & Benson, 2004; Kim et al., 2014). In general, 'quality' of writing is evaluated using a rubric. Table 3 shows an example of a writing quality rubric, which can be modified to different scales such as 1–5 or 1–7, for instance.

Another widely used evaluation approach is writing productivity (amount of writing) as indicated by the number of words written.[35] Although the amount of writing is not an end goal of writing, quality writing requires certain amount of writing and elaboration. Not surprisingly, writing productivity has a moderate to strong relation with writing quality, particularly for beginning writers (Abbott & Berninger, 1993; Kim et al., 2014, Kim, Al Otaiba, Wanzek, & Gatlin, 2015; Wagner, R. K. et al., 2011). Therefore, writing productivity may be used as one indicator of writing proficiency for beginning writers.

Whichever evaluation approach is employed, there are some important guidelines to keep in mind. First, establish clear and consistent evaluation criteria. When looking for quality of writing, various aspects are considered such as idea development, organization of ideas, use of vocabulary and varying sentence structures. Then all these different aspects (ideas, organization, vocabulary, and sentence use) have to be consistently considered across the rating scale. If quality of writing does not include judgements on handwriting and spelling, then the raters or teachers have to be careful not let these writing conventions influence their scoring of writing quality. Second, consistently apply evaluation criteria. When teachers evaluate students' writing quality based on the rubric, it is important to apply the rubric consistently across times so that students receive consistent scores regardless of when student's writing was evaluated (i.e., within-rater reliability). If multiple

[34] Most widely used in school settings in the US are quality rubric similar to what is shown in Table 3. Other approaches include writing productivity (amount of writing) and curriculum-based writing. The latter has been typically used in special education in the US. Although reliability and validity evidence exists for curriculum-based writing (see McMaster & Espin, 2007), it requires further study for its utility in school settings.

[35] When counting number of written words, recognizable words with invented spelling are counted. Excluded are nonsensible string of words or multiple repetition of the same words.

Table 3. Sample rubric of writing quality on a scale of 1–4.

Criteria	1	2	3	4
Idea development	Little evidence of ideas is present.	A sense of a main idea is emerging.	Ideas are overall coherent but lacks focus. Details are found.	Main are coherent, focused, logical, and novel. Details are appropriate.
Organization	No evidence of organizational structure	Emerging evidence of organizational structure	Logical organization but some mishaps	Logical and effective of organization
Vocabulary and sentence use	Little evidence of effect use of vocabulary and sentences (few words and sentences)	Vocabulary words are mostly common words and sentence structure is simple.	Some interesting and descriptive vocabulary words are used, and attempts to use varied sentences are made.	Vocabulary words are precise. Sentence structures are appropriate for expressing the main idea clearly.
Spelling	Few words are spelled correctly.	Many high frequency, one-syllable words tend to be spelled correctly.	Many words are spelled correctly, but many errors are found for multisyllabic words.	Spelling is mostly correct.
Punctuation	Punctuation is not used.	Punctuation use is limited.	Commonly used punctuations are correctly used.	Various punctuations are attempted and used correctly.

people are involved in evaluation, consistency across raters (inter-rater reliability) needs to be established. Establishing consistency or reliability requires rigorous training (Kim et al., 2014; Kim, Schatschneider, Wanzek, Gatlin, & Al Otaiba, under review). Three, collect multiple samples of writing (Graham, Harris, & Hebert, 2011; Kim et al., under review). Assessing students' writing on a single task or genre does not provide a full, clear picture about the student's writing skill. Therefore, it is important to assess students' writing skill using multiple prompts or tasks.

ICT Considerations

Computers, tablets, and mobile devices may provide opportunities for students to practice their writing skills, as well as for teachers to evaluate student work. Recent innovations include the Bloom software, which enables users to create their own books, and Story Weaver software, which facilitates the writing of stories. However, evidence from developing country settings on the effects of the use of this software is not currently available. Despite widespread concerns, there is no evidence of a negative effect of text messaging among youth on conventional spelling (Bushnell, Kemp, & Martin, 2011; Plester, Wood, & Joshi, 2009).

Research Gaps

There is a severe lack of research on writing development and intervention in low-resource countries. Therefore, research is sorely needed to address some foundational questions such as achievement levels of writing for students in developing countries, factors that contribute to writing development (school, student level factors including gender), effective instructional approaches to develop spelling and writing skills, and teacher capacity to teach and evaluate writing. In particular, attention is needed to assess writing skills at the discourse level (i.e., written composition tasks and evaluative approaches) that is reliable and valid, but does not require extensive training.

Chapter 4.
Key Factors and Actors Responsible for Improving Early Grade Literacy Skills in Developing Country Contexts

Section A. Promoting Literacy in Multilingual Environments

Background: What and Why Literacy Acquisition in Multilingual Contexts?

In many parts of the world, literacy acquisition occurs in multilingual contexts where children are expected to acquire literacy in multiple unfamiliar languages. Multilingualism impacts learning and reading outcomes at several levels and raises important questions about how to ensure that children in multilingual environments are able to learn in languages they do not speak and understand.

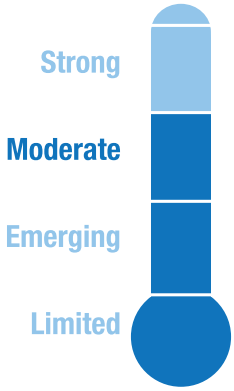
Any learning requires comprehensible input—learning cannot occur when content is presented in an incomprehensible manner (Vygotsky, 1978). One essential component for comprehensibility is the language of instruction ("the language used for teaching the basic curriculum of the educational system," Ball, 2011, p. 13)—instruction is delivered in a language comprehensible to students. Students learn better, including reading and writing, in a familiar language than in an unfamiliar language (Alidou et al. 2006; Ouane & Glanz, 2011; PASEC, 2015; Ramirez, Yuen, & Ramey, 1991; Thomas & Collier, 2002) and students' learning is negatively impacted when students are not familiar with the language of instruction (Marsh et al., 2002; PASEC, 2015; Yahannes, 2009). These effects persist over a lifetime, with higher earnings accruing to students who begin their schooling in their mother tongue (Patrinos & Velez, 2009). Yet, more than half of the world's out-of-school children do not have access to their languages in schools. In many countries, including Brunei, Timor Leste, Pakistan, Bhutan, and Haiti, 50 to 95% of the children in school are learning in a language they do not speak at home (Kosonen, 2005).

L1: First language. A person's first spoken language, and usually a mother tongue or a home language. In multilingual contexts, a person may have more than one L1.

L2: Second language. A person's second spoken language, which can be acquired at any point after the first, and can be acquired through various mediums, e.g. school, movies, friends and community interactions, or the market. In multilingual contexts, a person may acquire more than one L2.

When it comes to literacy acquisition in multilingual contexts, Cummins (1979, 2001) postulated that oral language and cognitive skills depend on each other for development, and cognitive skills developed in L1 facilitate learning in L2 (i.e., transfer of cognitive skills from L1 to L2; Ball, 2011; Dutcher, 1994; Hewlett Foundation, 2014). Empirical studies have suggested that students develop cognitive skills in a familiar language better than in an unfamiliar language (Dutcher, 1994). Therefore, it is important for students to develop cognitive skills (e.g., higher-order reasoning skills) in a familiar language, which, then, facilitates L2 literacy acquisition.

Literacy acquisition in multilingual context involves careful consideration at multiple levels of system. At the child level, each language impacts the learning of the next in significant and predictable ways (see below; e.g. August & Shanahan, 2006). As such, multilingual education contexts present important opportunities and some challenges for improving learning outcomes. At the regional level, education stakeholders and parents grapple with the question of which languages are linked to identity, self-esteem, and socioeconomic mobility, and must try to balance limited resources to help children access the benefits of both/all languages. At the national level, policy makers must decide which languages should serve as the languages of schooling, which languages should be taught as additional languages, and at what point transitions should occur from one language to the next.



Evidence from Developing Countries

Evidence about literacy acquisition in multilingual contexts is moderate. Despite a commonly held belief among some parents and teachers that L1 instruction might be unfavorable for L2 acquisition (Akyeampong et al., 2011; Altinyelken, Moorcroft, & van der Draai, 2014; Dutcher, 1994), extant evidence suggests that there is no disadvantage of L1 instruction in L2 language and literacy instruction, and L2 reading skills might develop faster if students have already developed reading skills in L1. Students learning to read in L1 had a higher achievement in reading in 14 southern African countries (Hungi & Thuku, 2010) and other countries (Hovens, 2002; RTI, 2008). In Gambia (RTI, 2008; Hsieh & Jeng, 2016), South Sudan (Laguarda & Woodward, 2013), Guinea-Bissau and Niger (Hovens, 2002) students learning to read in L1 performed better in reading than those learning to read in L2. In contrast, in Morocco, although Arabic-speaking children initially scored higher than Berber-speaking children in tests of Arabic literacy achievement, the difference disappeared after 5 years of instruction (Wagner, D. A., Spratt, & Ezzaki, 1989). Finally, in a recent study (PASEC, 2015), students in 10 sub-Saharan Francophone African countries were assessed on their academic achievement in reading and math. The language of instruction in the vast majority of these countries is a colonial language (i.e., French and English) that is unfamiliar to most children. An exception was Burundi where instruction was provided in language familiar to most students (i.e., Kirundi). Findings revealed that in all the countries but Burundi a high percentage of students did not reach sufficient proficiency level in reading and math. In contrast, in Burundi, the majority of students—approximately 8 out of 10 students in reading and 9 out of 10 students in math—reached sufficient proficiency level. This finding is particularly notable, given that a greater percentage of students received instruction from teachers without pre-service training in Burundi than those in the other countries in the study (PASEC, 2015).

These results of greater learning in L1 are in line with findings that L2 reading is impacted by L1 language and literacy development—L1 skills transfer and significantly impact L2 reading development (e.g., August & Shanahan, 2006; Geva & Zadeh, 2006; Koda, 2008). This transfer is manifested in different ways, including: (1) significant correlations between phonological awareness in two languages of varying degree of linguistic distances (see August & Shanahan, 2006 for two alphabetic languages; Kim, 2009 for alphasyllabic and alphabetic languages; and Wang, Yang, & Cheng, 2009 for morphosyllabic and alphabetic languages) (see Branum-Martin, Tao, & Garnaat, 2015); (2) L2 phonological awareness predicting L2 reading; and (3) L1 reading skills predicting L2 reading skills (see Koda & Reddy, 2008). Although some degree of transfer occurs in all writing system pairs, the degree of transfer is dependent on the pair of languages being acquired, and therefore, the nature of the language and writing system must be taken into consideration when planning language transitioning. For example, transfer between two

closely-related languages and between two alphabetic languages is likely to occur more quickly than between two different kinds of writing systems (see Nakamura & de Hoop, 2014).

Despite the consistent suggestions that students' achievement is higher when they receive instruction in a familiar language, and L1 oral language skills facilitate L2 literacy acquisition, there has been few randomized control studies that can indicate causal inferences. A recent study, however, employing a randomized control trial design indicates a positive effect of L1 instruction on literacy achievement (Piper, Zuilkowski, & Ong'ele, 2016). In this study, students in Grades 1 and 2 in Kenya were assigned to two conditions. In one condition, students received literacy instruction in two official L2 (English and Kiswahili). In the other condition, students received instruction in L1 in addition to the official languages. Students who received L1 instruction had higher achievement in EGRA literacy outcomes measured with effect sizes ranging from .3 to .6 (Piper et al., 2016).

In multilingual contexts, L1 instruction typically transitions to L2, and various language transition models exist. In subtractive models, students develop proficiency in the official language but lose their L1 proficiency. In many contexts, this is actualized by having the official language or L2 as a medium of instruction from the outset of formal schooling and not teaching L1 in the formal school setting. In transition models or early/late exit models, the target of schooling is to acquire proficiency in the official language (L2), but instruction starts in L1 and gradually transitions to the L2 either after 1–3 years (early exit) or 5–6 years (late exit). In additive bilingual education, L1 and official language are both used as medium of instruction.

Despite the existence of various language transition models, evidence is highly limited about the comparative impact of these various models on language and literacy acquisition in low-income multilingual contexts. Studies from developed countries suggest a need for providing sufficient instruction in L1 (5–6 years) to help develop cognitive skills, which then facilitates L2 acquisition (see Ball, 2011 for a review). According to another estimate, a child needs to know a certain number of words in each language to be able to become an independent learner of that language (e.g. 3,000 word families in English and 2,200 in French) (Little, Goullier, & Hughes, 2011). However, research-based thresholds have not been determined for many languages used as L1s in the developing world. Although initial evidence about the superiority of a transitional bilingual program over a subtractive model in the African context is suggestive (Hovens, 2002), rigorous research using a randomized control design is needed to elucidate conditions which best support students' language and literacy acquisition in multilingual contexts, including the point at which students have acquired sufficient language proficiency and developed cognitive skills in L1 to benefit L2 acquisition.

Summary of Important Design Considerations and Challenges

■ To the extent possible, ensure quality instruction in a language most familiar to the child—most times this will be their Mother Tongue or L1

Learning is facilitated when instruction is provided in a language that is familiar to students. The premise of the benefit of learning in L1 for L2 acquisition is quality instruction in L1. Quality literacy instruction should incorporate explicit and systematic instruction on reading as well as oral language (see Chapter 3). Oral language proficiency is a necessary condition for literacy acquisition, and children continue to develop their L1 language proficiency well into adolescence. L1 instruction does not just mean teaching through the language, but should include systematic teaching of L1 language itself (Ball, 2011; Tabors & Snow, 1994).

For the most effective literacy outcomes (not only in the mother tongue or local language,

but also in all other subsequent languages), it is best to begin teaching literacy to children in their mother tongue, L1, or very familiar language first in order to build foundational literacy skills that can then transfer to L2 literacy acquisition. Although the exact threshold point of transfer is not empirically identified, research suggests introducing L2 reading instruction after a certain level of L1 reading proficiency is reached (see Ball, 2011). A corollary of this reasoning would be to group children by skill level in their L1 reading, rather than starting the L2 with all students at a particular grade. In extremely heterogeneous classrooms or in situations where dividing children by language groups seems artificial or unnatural, literacy acquisition can begin in a language of wider communication or a regional language that all children are proficient in. In many contexts, this requires empirically establishing oral language proficiency and not relying on self-reports or census data for language ability.

Bridging into an L2 by building L2 oral language proficiency

As in L1 literacy acquisition, various aspects of oral language skills are involved in different aspects of literacy skills. Therefore, language sounds (phonological ability), morphological structures, vocabulary, and discourse level oral language skills in L2 should be explicitly taught to build foundations for L2 literacy acquisition. As noted in Chapter 3, small grain size domains of oral language such as phonological awareness and morphological awareness take a relatively short time to learn, provided access to explicit and systematic instruction. In contrast, acquiring sufficient proficiency in larger grain sizes such as vocabulary and discourse level oral language skills (listening comprehension and oral production) takes years.

Create curricula, standards, benchmarks, assessments, and instructional methods that reflect the language systems (phonology, orthography primarily)

As noted in chapter 3, languages vary in the phonological units that map onto orthographic symbols. Therefore, it is important to understand these phonological and orthographic features in phonological awareness instruction. When creating curricular sequence and scope parameters in any particular language, it should be in line with the cognitive demands of that language and writing system. For example, instructional focus on symbol-sound correspondences (decoding-related skills) is prolonged (e.g., grade 5) in South Asian akshara compared to other alphabetic writing systems because akshara has a great number of highly similar orthographic symbols.

Build teachers' own language proficiency in the language of instruction

It is not uncommon in multilingual contexts for teachers not to be proficient in the language of instruction (often colonial languages) or not trained on how to use L1 or L2 as a medium of instruction (Akyeampong et al., 2011; Gacheche, 2010; Mitton, 2008; Muthwii, 2004). In Senegal, fewer than 7% of teachers expressed confidence in teaching in the language of instruction (Akyeampong et al., 2011). Only 28% of teachers in Kenya reported that they were trained on using L1 as a medium of instruction (Begi, 2014; also see Akyeampong et al., 2011). When teachers do not have proficiency in the language of instruction, they do not implement the language of instruction and, instead, teach in L2 or in the language in which they are proficient (Akyeampong et al., 2011; Piper & Miksic, 2011; Piper, Schroeder, & Trudell, 2016). Similarly, approximately two thirds of teachers were not comfortable teaching in L2 (English) in Ghana (RTI, 2011). When teachers teach in a language in which they lack proficiency, instructional quality is poor—complex concepts are not explained properly (Muthwii, 2004) and

instruction is dominated by "safe talk" which does not make great demands on students (Gacheche, 2010). In contrast, when teachers teach in their proficient language, pedagogy is richer (EdQual, 2010). Therefore, teachers should be provided with sufficient training to build their own language proficiency in the language of instruction and to learn how to provide instruction in the language of instruction (e.g., strategic use of code-switching—alternating between two or more languages in conversations; Akyeampong, 2011; DeStefano et al., 2012; Dutcher, 1994; Falconer-Stout et al., 2015; Kyeyune et al., 2011; Mitton, 2008; Piper & Milksic, 2011). Although building teachers' own language proficiency requires resource allocation and has a high initial cost, it is cost-effective when considering prevention of repetition and dropout (e.g., Guatemala, Patrinos & Velez, 2009).

Reflect contextual issues and local needs

Language of instruction is a complex issue, embedded in various sociopolitical contexts. Therefore, language policy needs to work with local needs and build the necessary infrastructure to support language instruction in whatever language(s) are used (Benson, 2004). In many multilingual contexts, there is a disconnect between students' L1, teachers' L1, and the language of instruction. It is also not uncommon that students in the same class have different L1s. In Zambia, for instance, the number of students speaking the language of instruction at home varied from 18.7% to 82% depending on the region (Falconer-Stout et al., 2015). In areas of Malawi where Chiyao is the predominant language, 61% of students spoke Chiyao but the majority of teachers (67%) did not (Chilora & Harris, 2001). In places like Fiji there is no single dominant L1. In these contexts, creative approaches to meet local needs should be considered including team teaching, trading classes, and using paraprofessionals from the community (Benson, 2004). Therefore, prior to implementing L1 language and literacy instruction in a particular region, a good understanding about local contexts and languages spoken in the region is necessary (e.g., language mapping,[36] Benson, 2004) to have a clear picture about local language instructional needs and ensure that the local language needs are met (see Pflepsen, Benson, Chatbott, & van Ginkel, 2015).

Moreover, it is important to involve all stakeholders (Benson, 2004; Jones, 2012; Pflepsen et al., 2015) in the decision-making process around languages of instruction. Although studies from psychological and learning perspectives suggest a favorable outcome of L1 instruction for L1 and L2 language and literacy acquisition, local agency, teachers, and parents might have reservations about instruction in local languages or L1 for various reasons, including perceived economic advantages (Akyeampong et al., 2011; Altinyelken, Moorcroft, & van der Draai, 2014; Commeyras & Inyega, 2007; Iyamu & Ogiegbaen, 2007; Khejeri, 2014; Opoku-Amankwa & Brew-Hammond, 2011; Piper & Milksic, 2011; Trudell & Piper, 2014; Watson, 2007). These concerns often motivate stakeholders to pressure for an early transition model (i.e., where children transition from learning in L1 to learning in L2 in early primary; Jones & Barkhuizen, 2011).

Consideration of Environmental Characteristics and Resources

The choice of a language of instruction has implications for the development and provision of learning materials (Benson, 2004). While it is desirable for children to receive initial reading instruction in mother tongue or at least in a language they understand, some mother tongues or L1s do not have a written orthography. The process of developing and standardizing this can take years, although much progress has been made both by governments and groups like Summer Institute for Linguistics (SIL)

[36] Language mapping refers to gathering information about languages spoken in different geographic areas and proficiency levels of speakers (Pflepsen et al., 2015).

and the Institute for Popular Education in Mali.[37] For example, L1 implementation took a prolonged time in Malawi due to lack of human and material resources at both the classroom and the teacher training level (Kamwendo, 2008). Teachers needed to be trained to teach in the various L1s but there was a severe lack of materials beyond Chichewa and English. Likewise, publishing in L1 is often not lucrative for publishers in developing country contexts unless the government is the principal purchaser. Many people do not have disposable income to spend on books, and parents often prefer to spend their money on books in written in former colonial languages such as English, French, Portuguese and Spanish (Edwards & Ngwaru 2011; Opoku-Amankwa, Edu-Buandoh, & Brew-Hammond, 2014). Hence, a serious investment of time and resources is required to develop the materials necessary to effectively implement a L1 language policy in countries where a dominant and/or a colonial language have been used as the national language of instruction (Klaus 2003; Malmberg, Mwaura, & Sylva, 2011; Opoku-Amankwa et al., 2014).

Strategies to facilitate multiple language materials development processes for multilingual contexts include the development of a common structure and agreed upon content to be used in materials development across languages, flexible formatting to accommodate many languages, capacity building of local technical experts, and community involvement (Pflepsen et al., 2015).

Assessment Considerations

One potential benefit of L1 instruction is that it allows one to accurately evaluate whether students' learning difficulty is due to lack of language skills in L2 or other cognitive functioning issues (which are assessed in L1). However, this requires availability of language, cognitive, and literacy assessments in L1. Although assessments such as EGRA have been, and can be adapted to L1 considering language and orthography characteristics (Gove & Wetterberg, 2011), their primary focus is reading, and consequently broader language and cognitive assessment (e.g., working memory; inference-making) tools are limited (see Chapter 3).

ICT Considerations

Technologies, such as mobile phones, e-readers, and tablets, may offer at least partial solutions to many of the challenges of multilingual contexts. These devices can carry multilingual dictionaries, reading material in mother tongues, audio and video, and other electronic media that can help children learn how to read in multiple languages. Where available, ICTs may be particularly helpful when teachers themselves are not first language speakers of the language of instruction. Software such as that used in the Bridges to the Future Initiative in South Africa actively facilitates learning in multiple languages, allowing children to switch back and forth between languages (Wagner, D. A., 2014). Furthermore, resources such as SIL's Bloom software may increasingly help to produce the types of reading material needed in a range of languages, expanding the often limited amount of content available in mother tongues.

ICTs can provide access to texts in various languages, generally at a lower cost than for printed books. A recent review of mobile literacy interventions notes text-provision programs in Chile and South Africa, for example (Wagner, D. A., 2014), while Worldreader's mobile and tablet materials available in 43 languages have been used by more than 2.5 million people since 2010 (Worldreader, 2014).

Research Gaps

Efforts and initiatives in providing instruction in a language that is familiar to students are under way in developing countries (e.g., Ethiopia, Gambia, Kenya, Mali, Philippines), and many of these employ language transitional models—transitioning from

[37] For more information on SIL, see http://www.sil.org and for more information on IEP, see http://iepmali.org/index.php?lang=en

local, familiar language to L2 (see Mother Tongue Based-Multilingual Education;[38] Pflepsen et al., 2015 for resources and guidelines). However, information from rigorous empirical evaluation is lacking about effects and costs of various language transition models. The impact of various models of language transition is unclear for many important outcomes such as L2 language and literacy acquisition and repetition/dropout rates in various multilingual contexts. The reading experts interviewed for this report noted that the transition from L1 to L2 was an area ripe for research in developing country contexts.

Similarly, although the language transition models are based on the theoretical model of transfer of cognitive skills from L1 to L2, our understanding of the transfer of cognitive skills from L1 to L2 is primarily based on correlational studies. Future studies are warranted to reveal causal evidence. In addition, the hypothesis of linguistic threshold or optimal transition point (Cummins, 1976) requires a systematic and rigorous scientific investigation. Although this idea is attractive and plausible, quantifying a threshold is a complex task and thresholds are likely to vary depending on the target skill.

Also needed is our understanding about the impact of language policy and implementation at the local levels. In many multilingual contexts, national language policy is often not observed at the local levels (Trudell & Piper, 2014). Therefore, rigorous large-scale longitudinal randomized control studies are needed in order to investigate the impact of language of instruction in real-life contexts (i.e., an intent-to-treat study[39]). Related critical issues include teacher education and training and teacher assignment in relation to language of instruction (see Section B below). Moreover, given that some parents and teachers' negative perceptions about L1 instruction is one of the important reasons and forces in determining the extent to which L1 instruction is adopted and implemented at the local level, it would be informative to investigate the effect of a public information campaign about L1 instruction.

> ***"The quality of an education system cannot exceed the quality of its teachers"***
>
> (quote from a Korean official cited in Barber & Mourshed, 2007, p. 13) aptly describes the fact that teachers are at the center of education systems.

Section B. Teacher Knowledge and Teacher Education

Background: What and Why Teacher Knowledge and Education?

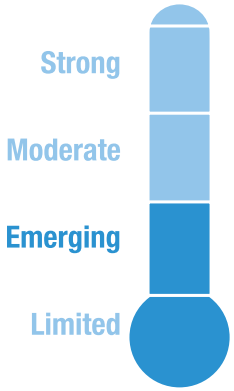
Any theory of change for improving students' literacy skills necessarily involves teachers' beliefs and knowledge about literacy development and instruction as well as their ability to use that knowledge in their teaching practice. Therefore, teacher education, including pre-service training (initial teacher education) and in-service training (continuing professional development), is central to efforts to improve students' literacy acquisition. Teacher knowledge and quality teaching[40] are important to student achievement (McEwan, 2014; Rivkin, Hanushek, & Kain, 2005), including improving children's literacy skill development (DeStefano et al., 2012; EDC, 2014a; McCutchen et al., 2002; Moats & Foorman, 2003; Piasta, Connor, Fishmann, & Morrison, 2009).

[38] *http://www.mlenetwork.org/*

[39] The intent-to-treat design in a randomized controlled study, adherence to the treatment or lack thereof is not included in the analysis. Therefore, all participants are included in the analysis once they The intent-to-treat design in a randomized controlled study, adherence to the treatment or lack thereof is not included in the analysis. Therefore, all participants are included in the analysis once they were assigned into conditions regardless of their actual implementation of the treatment (Gupta, 2011).

[40] Note that teacher knowledge and practice are influenced by their beliefs, values, and philosophical orientation (Paris, Wasik, & Turner, 1991; Fang, 1996).

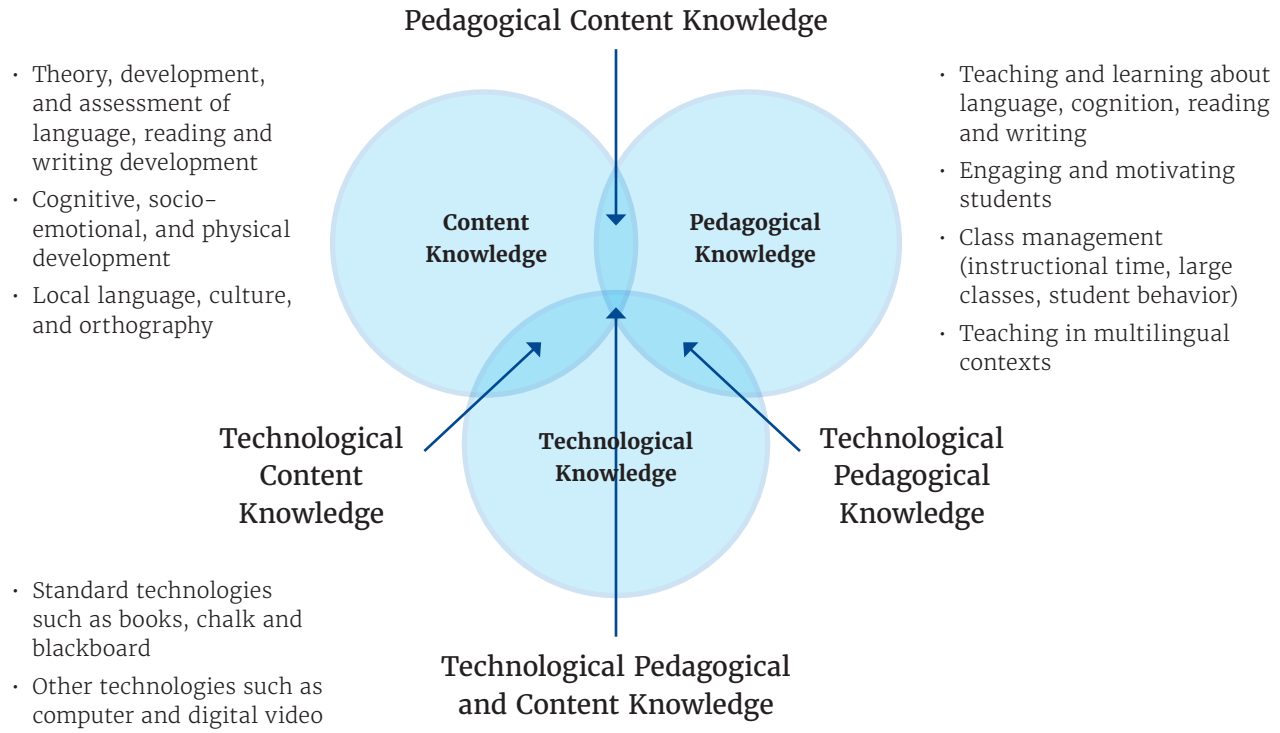
A competent teacher needs to have a complex array of professional knowledge for successful teaching. Figure 8 shows various aspects of teacher knowledge, including content, pedagogical, and technological knowledge. When applied to literacy instruction, teachers, for example, have to understand theories and the development of oral language, cognition, reading, and writing (Cunningham & Stanovich, 2004; Moats, 2009; see Chapter 3). They also have to know how to teach oral language, reading, and writing. Teachers should be able to use standard educational technologies such as books, chalk and blackboard as well as others such as computers, mobile phones, and tablets. Furthermore, critical in this framework are the intersections of these different aspects such as pedagogical content knowledge (what teaching approaches fit the target content); and technological pedagogy content knowledge (how to connect knowledge of technology with literacy skills and use it for teaching literacy skills).



Evidence from Developing Countries

Many teachers in developing countries are not prepared to teach reading and writing with particular difficulty with teaching higher-order skills such as listenening comprehenion, and reading comprehension (Akyeampong et al., 2011; Chesterfield et al., 2005; Falconer-Stout et al., 2015; Kyeyune et al., 2011). Grade 2 teachers in the Philippines showed 'deficient' and 'inadequate' practices in various aspects of teaching at baseline (Clark-Chiarelli & Louge, 2016). Many teachers in low-income countries do not know how to identify, monitor progress, and provide intervening instruction for students who need further help (Akyeampong et al., 2011; Tilson et al., 2013a). Furthermore, many teachers in sub-Saharan countries had little understanding about links between L1 and L2 literacy

Figure 8. Aspects of teacher knowledge based on Mishra and Koehler (2006), modified for teaching literacy skills.



acquisition and how to teach in multilingual contexts (Akyeampong et al., 2011).

Evidence indicates that teachers' attitudes, practices, and instructional strategies are all important predictors of student success (EDC, 2014a; see also Westbrook et al. 2013 for a review). High teacher expectations result in improved student outcomes and vice versa (EDC, 2014a). Teachers with greater knowledge of literacy instruction after teacher training implemented reading instruction to a greater extent, and their students achieved higher literacy skills in the Democratic Republic of Congo (EDC, 2014). Effective teaching practices included flexible use of grouping patterns, frequent use of additional learning materials, effective lesson planning, different types of questions (e.g. open and closed), and providing both a safe learning environment and feedback (see, e.g., Connor et al., 2014; Pianta et al., 2005 for evidence from US; see Westbrook et al., 2013 for a review from developing countries[41]).

Evidence is growing about the effect of teacher training on student literacy achievements. In Latin America and Caribbean contexts, teachers who received in-service training on literacy instruction through the CETT (Centers for Excellence in Teacher Training) program had greater knowledge about teaching literacy, and implemented the literacy strategies they were taught, and their students had higher achievements (Chesterfield & Abreu-Combs, 2011). Training improved knowledge of literacy instruction and attitudes and beliefs toward literacy instruction and acquisition for educators such as supervisors and teachers (RTI, 2016a). Furthermore, training improved literacy instructional practices for primary grade teachers in the Philippines (Clark-Chiarelli & Louge, 2016*) and Yemen (Pleiss et al., 2016*). In Nigeria, teachers who received training on reading instruction employed reading instructional practices more frequently (e.g., presenting letter names and sounds, asking reading comprehension questions) (RTI, 2016a). In the Democratic Republic of Congo, teachers' knowledge of teaching reading and writing explained students' reading performance (EDC, 2014a). Students whose teachers received more intensive training including coaching outperformed those whose teachers received more a superficial level of training (Tilson et al., 2013a). Similarly, students whose teachers received instruction on evidence-based literacy instruction had higher literacy skills in Jordan (RTI, 2014a) and Liberia (DeStefano et al., 2013*).

In sum, accumulating evidence indicates rigorous training can change teachers' attitudes, knowledge and instructional practices, and improve students' literacy achievements. Although promising, the body of literature largely consists of descriptive and observational studies, or multi-component, project-based studies of which teacher training and coaching were part. Consequently, less is known about effectiveness of various teacher training models and teacher education policy.

Summary of Important Design Considerations and Challenges

Teacher education is multi-faceted, including regulations, standards, assessment, recruitment, initial teacher education, in-service training programs, and retention, and evaluation (Wilson, 2008). Covering all these aspects is beyond the scope of the present report.[42] Instead, below are key considerations to building capacity for literacy instruction in low-income countries.

■ Establish curriculum aligned with evidence on effective literacy instruction in teacher education and professional training.

Teachers need an understanding of how literacy is acquired, how to teach literacy skills in the classroom, and how to use assessments to inform instruction. Areas for teacher knowledge in

[41] Note that many of the studies reviewed here did not include student literacy outcomes.

content, pedagogy, and technology for literacy instruction (see Figure 8) directly map onto what is covered in Chapters 2, 3, and 4 (Section A). In other words, teacher training, either preservice teacher education or ongoing professional development, should, at minimum, target the following areas: orthography, oral language, and cognition. Knowledge about orthography refers to how sounds and meanings in a language are mapped onto the writing system of a language, and includes orthographic symbols, the alphabetic principle, graphophonological knowledge, and orthographic patterns. Knowledge of oral language includes phonological structure, semantic structure (morphology and vocabulary, grammar), and language use (pragmatics). Cognitive factors include working memory, attentional control, and higher-order thinking skills such as reasoning, inference, perspective taking, and comprehension monitoring.

The primary place where newly certified teachers gain their knowledge about subject content and pedagogy is preservice teacher education programs (Akyeampong et al., 2011, 2013; Kyeyune et al., 2011). Therefore, curriculum in preservice teacher education programs is critical to ensuring that teacher candidates acquire necessary skills for literacy instruction. As documented Chapters 2 and 3, evidence about what needs to be targeted for effective literacy instruction in developing countries is accumulating, and therefore, should be incorporated into the teacher education curriculum (Piper & Korda, 2011b). In particular, in many low-income countries, there have been no specific courses targeting teaching reading, and reading has been folded into language teaching in teacher education curriculum (Akyeampong et al., 2011; EDC, 2013; Kyeyune et al., 2011). This creates misalignment between the teacher education curriculum and the elementary grades curriculum—reading curricula in the elementary grades in many countries have been updated recently, whereas many teacher education curricula have not been revised in parallel (Akyeampong et al., 2011; Pryor, Akyeampong, Westbrook, & Lussier, 2012). The literacy curriculum should encompass content, pedagogy, and technology (or ICT) and their intersections shown in Figure 8. Teacher education courses often focus on subject content, but not pedagogy (Akyeampong et al., 2011, 2013; Bunyi, Wangia, Magoma, Limboro, & Akyeampong, 2011), which is essential in the professional field of teaching (Akyeampong et al., 2013; Bunyi et al., 2011). Then, performance benchmarks and standards for teacher education curriculum should be clearly defined and aligned with theory and empirical evidence about teaching literacy (see Chapters 2 and 3; Adekola, 2007; Pryor et al., 2012).

Student teaching (or practicum) is an important part of curriculum in pre-service teacher education programs, and should be tightly connected to coursework, and should be systematically organized and supervised. However, gaps between courses and practicum have been consistently reported (Akyeampong et al., 2011; 2013) such that what is taught in teacher training programs does not match with the real world of teaching—dominant instructional approaches in preservice programs are lectures and taking and copying notes with little connection and opportunity to teach (Akyeampong, 2003). Moreover, student teaching is often short without sufficient opportunities to observe and participate in teaching (Akyeampong et al., 2013; Kyeyune et al., 2011), and are not systematically supervised and supported by both expert teachers and college

[42] One example of an important factor, but is beyond the scope of the current report is recruitment of qualified teacher candidates considering local needs. Many prospective teachers in sub-Saharan Africa do not meet qualifying grades for entry into training programs, which then requires them to take remedial courses (Akyeampong, 2003). When it comes to literacy instruction, recruiting local teachers who are fluent in the language of instruction and familiar with local social and cultural contexts (Young, 2009) is important to promote students' literacy acquisition (Ball, 2011). In order to attract and sustain strong prospective teachers to pre-service teacher training programs, incentives should be offered such as subsidizing teacher candidates' studies, particularly for those who can teach in needed areas (UNESCO, n.d.).

tutors (Akyeampong et al., 2011; Hardman, Abd-Kadir, & Tibuhinda, 2012).

Develop expertise of teacher education faculty in literacy acquisition and instruction.

An important corollary is building capacity of faculty in teacher education programs about literacy acquisition and instruction based on growing empirical evidence. In many contexts, faculty at teacher education programs lack knowledge about literacy acquisition and instruction (EDC, 2013) as well as classroom teaching experience. Evidence-based curriculum is necessary but curriculum itself does not ensure rigorous, quality training of prospective teachers on content and pedagogy of teaching literacy skills (Akyeampong et al., 2011; Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Ginsburg, Rose, Adelman, 2011; Hardman, Ackers, Abrishamian, & O'Sullivan, 2011). Capacity building of faculty in teacher education programs is particularly important for sustainability of quality teacher education in literacy education.

Provide systematic and sustained in-service (or continuing) training.

Systematic and sustained continuing professional development is particularly important in low-income countries where new reading curricula in elementary schools have been recently implemented, and consequently the vast majority of educators (teachers and supervisors) have not received corresponding training in teaching reading. Actual participation in professional development varies largely in sub-Saharan Africa (Akyeampong et al., 2011; Hardman et al., 2011; Kyeyune et al. 2011), and the vast majority of trainings are small-scale and ad-hoc one-time programs (see Akyeampong et al., 2011).

One consistently reported challenge in implementing literacy interventions has been changing teachers' instructional behaviors (Clark-Chiarelli & Louge, 2016; Falconer-Stout et al., 2015; Piper & Korda, 2011b; RTI, 2011, 2014c, 2015b). In a multicomponent intervention study in Ghana, many teachers were found to adhere to only part of the teacher's guide on literacy instruction (RTI, 2011). In Jordan, teachers had difficulty adopting new pedagogies into their instructional practice, and expressed that their new literacy curriculum added too much work and burden to them. Perhaps this explains teachers' overwhelming response that they were not likely to continue the systematic literacy instruction even after they acknowledged their positive attitudes towards new literacy instruction and student outcomes (RTI, 2014a).

Teachers developed certain teaching styles and beliefs over the years based on their own experience of learning, learning in the teacher education programs, and their own practice. Therefore, changing their beliefs and instructional behaviors would not be achieved easily after a few training sessions (see EDC, 2014b for some recommendations about implementing a teacher training program). Support structure is necessary to sustain newly learned knowledge and instructional approaches. Sustaining new behaviors requires a programmatic, multi-faceted approach where continuing professional development is institutionalized and systematic for both newly qualified teachers, experienced teachers, and other stakeholders (e.g., teaching assistants, supervisors, and principals; Akyeampong et al., 2011; Bunyi et al., 2011; Dall, Losert, Purwadi, Bandi, Triatmoko, Maskoen, 2015; EDC, 2014a; Gabr, Gavin, Lambert, & Mourad, 2015; Raupp et al., 2015). Teachers benefit from continued feedback and support, including refresher training, support visits, and coaching on a regular basis (e.g., Dall et al., 2015; Dubeck et al., 2015; EDC, 2013, 2014a; RTI, 2014a,b, 2016a; Piper & Korda, 2011a; Pouezevara et al., 2013).

Cluster-based mentoring programs or Teacher Study Groups are examples of continuing professional development strategies implemented in sub-Saharan Africa, Philippines, and Pakistan (Barrett et al., 2007; EDC, 2014; Hardman et al.,

> ***"Good teachers are costly, but bad teachers cost more."***
>
> *Bob Talbert*

2011; Kraft & Epstein, 2014; Piper & Korda, 2011b; Piper & Zuilkowski, 2015; RTI, 2014a, 2016a) and elsewhere. Various forms exist, but generally, teacher educators or experienced teachers serve as mentors and facilitators, and work with teachers in a cluster of schools (see an example in Nigeria, RTI, 2016a; Pakistan, Barrett et al., 2007; in Liberia, Piper & Korda, 2011b). It is important to ensure that coaches spend sufficient time on pedagogical support for teachers. For instance, in Kenya, lower teacher-coach ratios (10 teachers per coach versus 15 teachers per coach) were related to positive student outcomes (Piper & Zuilkowski, 2015). Frequent supervisor or coach visits were associated with higher student reading skills (RTI, 2015a).

For all these options, cost and efficiency must be worked out (Dubeck, Jukes, Brooker, Drake, & Inyega, 2015). Teacher education and professional development requires a significant amount of time and associated cost (Darling-Hammond, Chung Wei, Andree, & Richardson, 2009). In examining cost and efficiency for initial teacher education programs, factors such as class sizes, tutor-trainee ratio, contact hours per week (teaching periods), and the cost per trainee should be considered (Akyeampong et al., 2013) in relation to student achievement (Tilson et al., 2013a).

Consideration of Environmental Characteristics and Resources

Teacher education should include training on how to create instructional materials, and how to use and integrate available resources in local contexts. In addition, teacher resource rooms or centers can be created within schools or clusters to store and share materials, especially in environments where they are scarce; even more desirable is the inclusion of shelves and locking cabinets or trunks in school classrooms. While it is clear that the core texts for reading instruction, such as leveled readers, cannot be created by teachers who are just learning how to teach reading, support materials for a print rich classroom can be, if teachers have the supplies and space. For instance, in Ethiopia, where clusters were formed, the teachers in the cluster schools had access to a resource room at the partner college (Piper, 2010b).

As for instructional materials for teacher training, highly structured, scripted manuals and teacher guidebooks have proven effective for ensuring direct instruction in reading for in-service trainings (e.g., Piper & Korda, 2011; Piper et al., 2015; Tilson et al., 2013a; EDC, 2013). However, no research is available about textbooks and instructional materials for pre-service training programs.

Assessment Considerations

Several projects developed direct teacher knowledge and attitudes assessments (see EDC, 2014a; EDC, 2015; Falconer-Stout et al., 2015; RTI, 2016a), and teacher and leadership surveys and questionnaires (Falconer-Stout et al., 2015; Pouezevara et al., 2013; RTI, 2014a; Spratt et al., 2013; Tilson et al., 2013a). These have been crucial in revealing many characteristics in the current status of teacher knowledge, pedagogical approaches in literacy instruction, and teachers and education leaders' attitudes and beliefs about literacy acquisition and instruction in developing countries. However, these have been primarily used as part of professional development in multi-component intervention projects, and has not been applied yet to pre-service teacher education contexts. Thus, once pre-service teacher education curriculum is aligned with recently emerging scientific evidence (see above), assessments of pre-service teachers' developing knowledge also should be aligned with the revised curriculum. Then, the assessments used in these previous project can be useful starting places to develop such assessment of teacher knowledge.

Similarly, classroom observations also reveal valuable information about instructional practices and the extent to which effective instructional practices are implemented. Various classroom observation protocols have been developed and widely used (Adelman et al., 2015; Clark-Chiarelli & Louge, 2016; Falconer-Stout et al., 2015; Raupp et al., 2015; RTI, 2011, 2014a, b, 2015c, 2016a; Spratt et al., 2014; Tilson et al., 2013a,b), and can be adapted and used in teacher education contexts.

ICT Considerations

ICTs have the potential to be particularly important in areas where the shortage of a quality teaching workforce is a serious challenge, or in rural areas, where teachers may have less access to face-to-face training. Several ICT options such as use of video (EDC, 2014a) and other forms of technology (e.g., online forums; Kucan, Palincsar, Khasnabis, & Chang, 2009; Greene, 2015; RTI, 2014b) are potentially promising and further studies are required to determine their effectiveness (Abadzi, 2012; Abadzi & Martelli, 2014). An e-learning portal, for example, could provide teachers, supervisors, and school administrators access to learning materials (see work in Egypt, RTI, 2014c; EDC, 2013). Teacher education programs could include the distribution of lesson plans and teacher guides on tablets, as in the PRIMR program in Kenya (Piper, Zuilkowski, & Mugenda, 2014), the usage of mobile phones to text information to teachers (as in the HALI project in Kenya; see Brooker et al., 2010), or the loading of enrichment activities and pronunciation sound clips on various devices. Interactive audio instruction has been used in Mali and South Sudan (EDC, 2013, 2014b) as well as in the Democratic Republic of Congo (EDC, 2014a).

In Indonesia, where internet access via mobile phone is fairly widespread, a collaboration of the International Literacy Association, the Nokia Corporation, the Pearson Foundation, and the Collaborative for Teaching Learning implemented a hybrid training program for literacy teachers that combined traditional in-person trainings with a range of online videos and student materials (Greene, 2015). Teacher Education in Sub-Saharan Africa (TESSA) and Bridge IT projects in Latin America incorporated smartphones, educational videos, and MP3s, but technical challenges were encountered (e.g., difficulty with internet connection; Agyei & Voogt, 2011[43]). Therefore, potential roadblocks and solutions in using ICT for teacher education policy should be carefully considered, including the reliability of internet access and the identification of devices that can be used with the resources available (e.g., solar powered tablets). Despite these issues, teacher-focused ICT programs have become widespread. A recent series of UNESCO publications on mobile learning details teacher support and training projects in North and Latin America, Europe, Asia, Africa, and the Middle East (UNESCO, 2012).

Research Gaps

Gaps are many and wide in all areas noted above, particularly as it relates to literacy instruction and associated student outcomes. The experts interviewed for this report also pointed out that research on how to train teachers to teach reading for comprehension was lacking. The following are some of the salient overarching questions: effective incentive programs that attract strong teacher candidates, keep them in teaching forces (e.g., attracting teachers who are proficient in the language of instruction and students' L1), actually teach at school (e.g., teacher absenteeism, Piper & Korda, 2011a; Raupp et al., 2015; RTI, 2016a), and adopt new evidence-based instructional approaches; cost and financing of various approaches to pre-service and in-service teacher education to enhance teachers' capacity to deliver effective literacy instruction; innovative approaches to connect learning experiences in teacher education and actual classroom teaching with regard to literacy instruction; effective in-service professional

[43] Although this study was in the context of mathematics education, the gist of the idea is applicable here.

Illustrative Example of Teacher Training and Coaching

The following example is drawn from the EGRA Plus: Liberia, which was a two-year project (2008–2010) with multiple components including explicit instruction of a multicomponent intervention, teacher training, coaching of teachers, and sharing student reading performance with parents. This example is to illustrate a general approach (and its variation) to teacher training and coaching that is widely adopted in many multi-component intervention studies with effects in student literacy outcomes (see above). See Piper and Korda (2011) for results of the project.

The project employed the "training of trainers" model where coaches were trained by experts, followed by coaches' training of teachers in a cluster-based face-to-face training. Coaches also provided school-based support.

Coaches and teachers were trained for 5 days with a focus on the following content.

- Foundational knowledge on how beginning readers learn to read, including assessments
- Practice in learning to pronounce speech sounds in a target language
- Overview of the curriculum lessons
- How to teach each lesson with an emphasis on instructional routines

On Day 1, trainees learned about the relations of phonological awareness and reading, and received training on articulating sounds of the target language (i.e., English).

On Day 2, trainees learned about assessments (i.e., EGRA), and practiced administration. They were provided with assessments, and watched demonstration of assessment administration. This was followed by actual practice of administration of tasks with trainers' supervision. Practice and role-play included commonly observed administration errors. Furthermore, trainees practiced scoring and consistency in scoring (i.e., reliability).

On Day 3, trainees practiced teaching literacy lessons. Modeling was provided and trainees practiced in pairs. Instructional components were discussed and clarified with iterative process of modeling and practicing.

On Day 4, trainees learned about progress-monitoring assessment, reviewed EGRA assessment, and practiced administering them. Trainees also practiced a different lesson to teach to colleagues or to students on the following day.

On Day 5, trainees taught lessons to the group, which were videotaped. Strengths of the lesson as well as recommendations for improvement were discussed, followed by further practice, if necessary.

In addition to this training, coaches also provided a refresher training for an additional 5 days, covering topics such as foundational knowledge of reading development, lesson plans, instructional routines, practicing lesson delivery, administration of assessments, and discussion of working with parent-teacher association. Coaches visited on a regular basis (2–3 times per month in Year 1; once per month in Year 2), following a schedule and scope of work according to a work plan. During visits, coaches conducted the following.

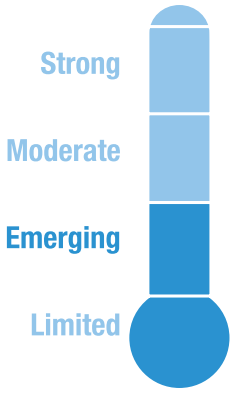
- Observe classroom instruction using an observation checklist, and ensure that reading instruction is implemented daily.
- Examine classroom setup to ensure instructional materials (e.g., word cards, decodable books) are readily available for instructional use.
- Provide modeling of instruction. During lesson modeling, the teacher observed the coach's instruction and completed the observation checklist, followed by facilitation of teaching the lesson.
- Assess a few students on reading skills.
- Meet with the principal to garner continued support for reading instruction.

developmental approaches (see Lewin, 2004 and Westbrook et al., 2013 for types of training programs); and various approaches incorporating ICT related to literacy instruction for teacher training and its impact on teacher knowledge, teacher practice, and student outcomes. In addition, rigorous evaluation of various teacher education policies on student literacy outcomes is necessary. When randomized control studies are not feasible, alternative approaches such as phased implementation should be evaluated with rigor (Tilson et al., 2013a). Finally, a large gap exists regarding capacity building of teacher education faculty with regard to literacy instruction. No studies have systematically tested different approaches to teacher educator training, how teacher educators develop their own capacity and practice in literacy instruction, and how these factors are linked to student literacy achievement.

Section C. Parental and Community Engagement

While this report focuses largely on school-based reading programs, children's experiences in their families and communities clearly impact literacy development as well. Family experiences related to literacy vary in aspects such as the value placed on reading, the presence of books in the home as well as literacy-related practices such as adults reading with children, and opportunities for verbal interaction (Hess & Holloway, 1984). This is typically referred to as home literacy environment and is typically measured by surveys (see Dowd & Friedlander, 2016 for a sample home literacy environment survey).

In developed countries, a large body of research demonstrates that various aspects of home literacy environment do indeed affect children's emergent literacy skills, including vocabulary, letter knowledge, and concepts of print (Dynia, Lawton, Logan, & Justice, 2014; Hayiou-Thomas, Dale, & Plomin, 2012; Kim, 2009; Niklas & Schneider, 2013; Sénéchal & LeFevre, 2014). While a recent USAID-funded literature review found mixed evidence for the effects of home reading programs, the authors did find that the Dialogic Reading approach did have effects on children's vocabulary and other early literacy outcomes, though the effects may not persist over time (Cao, Ramesh, Menendez, & Dayaratna, 2014).



While parental and community engagement have been studied extensively in the U.S. and other developed countries, less evidence is available in developing countries. A handful of studies do provide some emerging evidence on the subject. In Zambia, a study of 72 first-graders in Lusaka linked orthographic awareness and decoding ability to parents' attitudes toward reading and reading activities in the household (Chansa-Kabali, Serpell, & Lyytinen, 2014). In a study of 50 children in Bangalore, India, Kalia and Reese (2009) found an association between parental book reading and early literacy skills. A Save the Children study in Malawi found associations between parental attitudes toward children's literacy learning—for example, "I feel confident I can help my child learn to read"—and children's literacy skill improvement during an academic year (Dowd, Wiener, & Mabeti, 2010). Both parental literacy and the presence of print materials in the home were related to children's literacy performance in Iraq (Brombacher, Collins, Cummiskey, Kochetkova et al., 2012). In a rare comparative study across four multiple developing countries, Friedlander (2013) found that home literacy environment factors accounted for between 1.2 and 14.9% of the variance in models predicting student literacy outcomes in the Philippines, Uganda, Mali, and Ethiopia. As a whole, these studies suggest that home literacy environment factors support the development of children's literacy skills in developing countries in the same manner as they do in wealthy countries. However, it may be that certain aspects of the home literacy environment, such as access to

print materials, are particularly important in contexts where schools and libraries are undersupplied with books, and most children have little formal exposure to text.

Further research is needed not only to elucidate the relationships between the broader home and community environments with literacy development, but also effective strategies to increase community involvement to promote students' literacy achievement. Although some projects (e.g., RTI, 2015c; also see many Literacy Boost studies by the Save the Children) have implemented home and community activities, which is in the right direction (see Figure 1 in Chapter 2), their effectiveness is unclear. In particular, it is important to identify effective ways to involve parents and community members with low literacy levels into literacy programs. Parents must be able to read well enough to coach their children (Cao et al., 2014). This suggests that parent literacy programs may be complementary to early-grade reading interventions. Older siblings may also be resources within the household for new readers, as on average youth literacy rates are higher than adult literacy rates in developing countries (UNESCO, 2015). Despite these challenges, programs around the world have incorporated various degrees of parental involvement into literacy programs—from the Family Literacy Project in South Africa to the Vanuatu Literacy Education Program (UNESCO, 2008).

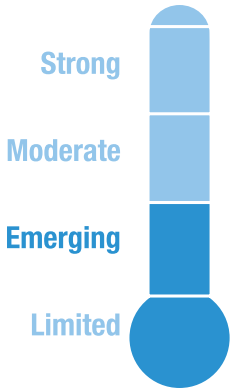
A recent USAID review investigated the potential of behavioral change communications approaches to further the impact of early grade reading programs (Schmidt, 2014). Such methods, which have, to date, generally been used for health promotion, may provide new strategies for literacy promotion at the household and community level. For example, a behavioral change communications intervention could focus on changing parent-child reading behaviors in the home. Given that school-based approaches alone have not proved sufficient to reach the goal of widespread reading proficiency among early grade children in many developing countries, broadening the scope of literacy interventions beyond the school is a necessary step. Some programs, like Save the Children's Literacy Boost, have begun to routinely incorporate home and community reading components into early grade interventions.

Chapter 5. Long-run Consideration of Literacy Programs: Costs, Financing, Scaling up, and Sustainability

Background: What and Why?

All literacy programs should be designed in ways that are sensitive to issues of cost and sustainability. International aid fluctuates, as it did in the aftermath of the global financial crisis (Tilson et al, 2013a), and the percentage of aid dedicated to basic education varies over time as well. Some countries obtain over 50% of their education budgets from international aid, putting their education systems at great risk during times of economic turmoil (UNESCO Institute of Statistics, 2011).

Improving literacy instruction will have long-term effects for student outcomes and system efficiency, but only if programs are implemented widely and supported locally as well as at higher levels of the educational system. In a recent report examining 14 case studies, Robinson, Winthrop, & McGivney (2016) identified four key components of successful scaling up: design, delivery, finance, and enabling environment. While the authors note that contextual factors influence scaling processes, these four broad areas are likely critical to long-term success.



Evidence from Developing Countries

Relatively little comparable student-level cost effectiveness data is currently available. In a randomized control trial in Kenya, the Primary Math and Reading Initiative (PRIMR) intervention program was both cheaper per child and more cost-effective than the existing government program, in terms of words per minute per dollar spent (Piper et al., 2014). In Mozambique, the full implementation of the Aprender a Ler early grade literacy intervention cost an additional $2.75 per student, but resulted in greater literacy learning than in control schools (Raupp et al., 2015). By contrast, in the Malawi Teacher Professional Development Program every dollar spent per child increased children's oral reading fluency by just one word per minute (Tilson et al., 2013a), which is relatively expensive. This limited body of research does not allow for a conclusion as to the likely impact of changes in literacy instruction on national education budgets.

Promising Practices

While rigorous evidence is limited, the experiences of chiefs of party and literacy technical experts working in developing countries suggest several possible approaches to enhancing cost-effectiveness and sustainability. The first and most critical step in ensuring that literacy programs are sustainable is the careful examination of the per-student costs of programs. Costs may not be significantly higher than existing costs of literacy instruction, particularly when the potential enhancements of system efficiency are taken into account—students who read better may be less likely to repeat grades and more likely to complete education cycles. However, it is possible to leverage potential efficiencies through improved technical specifications for books (along with improved capacity

to develop technical specifications), reduction of corruption in procurements and better supply chain management, for example. The feasibility of establishing a Global Book Fund to help to mitigate some of these challenges has been explored through a combined donor initiative (Results for Development, 2016).

For best comparability, literacy program evaluators need to present per-child costs, including teacher training and supervision, materials, and information and communication technology. Where possible, program planners and donors should work with existing government structures, such as pre- and in-service teacher education organizations, rather than creating costly and duplicative structures. Materials costs are another area of concern as regards sustainability; intervention approaches are often too costly for national scalability as initially designed (Davidson & Hobbs, 2013).

Second, it is important for donors to develop long-term partnerships to allow for scaling up and sustainability. When successful aid-supported programs transfer to government control, the programs' effects often weaken (Bold, Kimenyi, Mwabu, Ng'ang'a, & Sandefur, 2013), and system-wide success stories are rare (Levin, 2010). One of our interviewees put it as such:

> I think the main issue we deal with is that projects are organized to have deliverables and those deliverables don't match what governments do. So, if you just do the thing you have to do and convince your donor that you're doing a good job, and you skip the step of working within the government structures, you can get a deliverable done, but you haven't done it through the people who have to sustain it.

Interviewees also commented that donor agencies should commit to longer funding periods that allow teachers, parents, and other stakeholders to adapt to new approaches and see positive effects. Longer cycles allow for more stable planning, as well as for greater creativity in recipient countries (Birdsall, Levine, & Ibrahim, 2005). It is critical to build capacity (Smith, 2005), including among influential local champions who will support the program in the future. As capacity increases, the potential for significant local ownership increases as well.

Third, donors and program evaluators must provide countries with the necessary evidence to justify the continuation and expansion of literacy programs. While there is currently a paucity of publicly-available cost-effectiveness data, particularly from medium- and large-scale experimental studies, international donors should jointly commit to the sharing of such information. Guidance is available from a number of sources on the analysis of cost-effectiveness data (Dhaliwal, Duflo, Glennerster, & Tulloch, 2012). Program effects on their own are insufficient for the purposes of judging whether a program is worthy of highly limited resources, particularly in an environment where international education aid is decreasing.

Research Gaps

Unfortunately, there is currently not enough data from rigorous studies to compare cost-effectiveness across types of education interventions (McEwan, 2014) and early grade literacy programs. Evaluations have, to date, focused more on outcomes than per-student costs and sustainability factors. The figures presented above for programs in Kenya, Mozambique, and Malawi suggest that costs may vary, but are not directly comparable due to differences in what is included in per-child program costs. On a broader scale, greater research is also needed regarding the political and economic factors that are supportive of long-term educational policy change sustainability.

Chapter 6. Conclusion

Substantial efforts and strides have been made in the last decade to promote early literacy skills for students in developing countries. Reviewing many documents for the present report convinced us that we have a better understanding about what it takes to impact 100 million children's lives through enhanced literacy skills. At the same time, several themes emerged, offering lessons and directions for the next generation as we implement the Sustainable Development Goals, particularly, of ensuring inclusive and quality education for all and promote lifelong learning.

First, improving students' literacy skills requires systemic efforts, involving stakeholders at multiple levels (see Figure 1 in Chapter 1). As illustrated in the chapters, these involve factors related to student, teachers, family members, those in the community, and in larger contexts. Therefore, simultaneous, concerted, and organized efforts are needed to address multiple, complex, and large system issues such as building individual and institutional capacity and garnering commitment and support from government at the national and local levels (political support and commitments, social and cultural capital).

An important corollary to systems change is the incorporation of a long-term, cumulative-effects-perspective. Changing systems, and habits of learning (students) and teaching (teachers) themselves take time and practice. Learning is cumulative such that effective instruction in one grade alone does not ensure literacy acquisition. Instead, students need to be exposed to quality instruction in oral language, reading, and writing throughout their schooling experience. This is particularly important for higher-order skills such as listening comprehension, reading comprehension, and written composition as development of these skills depend on development of lower-level language and cognitive component skills. Similarly, teacher learning is cumulative, and requires sustained opportunities to learn and practice new pedagogical skills and approaches. The vast majority of studies in developing contexts were project-based, tied to short-term funding, and did not allow for longer-term planning and skill development. This might be attributed to an unspoken assumption that change can and will happen in a short time. The incremental nature of reorienting a whole system full of diverse actors toward new practices and behaviors is often unacknowledged. Longer project cycles would allow for time to trace systemic change as well as pupil achievement over a more realistic period of time.

Second, while much has been learned, there are still large and deep research gaps. Projects with multicomponent interventions constitute the venue for much of the recent international research on early grade literacy, and projects tend to take a comprehensive approach (e.g., multiple skills are targeted, teachers are trained and coached, and materials are developed simultaneously), as opposed to an experimental study where one or a limited number of targets are carefully manipulated. The multicomponent intervention is reasonable and necessary in the contexts where literacy instruction is nearly nonexistent. On the other hand, however, the downside of this approach is that it is difficult to manipulate and tease specific information on the "active ingredient(s)" in a large scale such as effective

combination of components and amount (dosage). For instance, although emerging evidence suggests that scripted lesson plans facilitate literacy instruction, fully addressing the effect of scripted lessons requires manipulating this aspect alone carefully (highly scripted lessons versus lessons with little explicit directions and dictions) while holding other things constant (e.g., intervention content).

The findings in the present report, in combination with previous findings in developed countries, provides good initial ideas about how to provide literacy instruction in developing countries. However, some fundamental questions still largely remain open such as effective ways to enhance higher-order skills such as oral language skills, reading comprehension, and writing (written composition); and how much instructional time is necessary or sufficient for different literacy component skills in in different contexts. While these questions will provide foundational information about what works, this is far from sufficient to ensure inclusive and quality education for all and promote lifelong learning. We need to develop a more fine-grained understanding about *what works for whom in what context.* Many of the reviewed studies revealed that effects varied as a function of multiple factors such as student characteristics (gender, socio-economic backgrounds, disability status), home literacy environment, school characteristics (types and management structure), region (rural or urban), and language context (L1 vs. L2). Understanding these nuances is necessary to move beyond access to and provision of quality education, and obtain the goal of ensuring *inclusive* and *equitable* quality education (UN Sustainable Development Goals).

Consistent with its systemic nature, system-level research gaps need to be addressed (e.g., teacher education, and language policy; see relevant chapters). For instance, one such question is how to incorporate research findings on effective literacy instruction into the system including teacher education and the ministries of education. Others that are not directly addressed in this report, but are important to students' learning, include early childhood education, childhood health factors, and the direct and indirect costs of education.

The third major theme that emerged in the review was a great need for establishing standards for quality reporting of projects and studies to inform future projects and studies. As noted earlier, we acknowledge that project reports serve various audiences and purposes. However, lack of consistency and necessary information makes it difficult to compare results across contexts, replicate, and analyze them to identify factors that contribute to success or failure. Large variation existed in the documents reviewed in the extent to which important information was reported including quality of measures (e.g., reliability and validity; equivalence of assessments at different time points), process of assignment to condition, implementation quality, sample attrition, analytic approaches (e.g., accounting for unit of assignment, baseline performance), basic statistical information at baseline and endline (e.g., means, standard deviations, bivariate correlations), and effect sizes. All of this information is necessary to adequately evaluate quality of conclusions and the studies. One example of a reporting guideline can be found at the What Works Clearing House in the US context.[44]

Also glaringly absent in many documents were a clear description of instructional approaches in the treatment and comparison conditions. When it comes to treatment condition, although many documents noted that multi-components were targeted (i.e., phonological awareness, orthographic symbol knowledge, word reading, reading fluency, reading comprehension, and oral language), the nature of lessons or scope and sequence were not illustrated, nor were they clearly referenced. Detailed description of comparison condition is also important because this is the counterfactual condition against which the treatment condition is pivoted. Note that this

[44] http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v3_0_standards_handbook.pdf

reference condition is not same across contexts, nor are they the same at different times even in the same context (e.g., instructional approaches in comparison condition may change). Therefore, clear descriptions about instructional approaches in the treatment and comparison conditions provide crucial contextual information about what works or does not work in what contexts and to what extent.

Efforts thus far changed and improved many millions of students' lives around the globe. Many actors were involved in this grand effort, and have played crucial roles to make this positive change at a global scale. The positive results we have seen in this report behooves us to further challenge ourselves to move the field forward by reviewing and reflecting on lessons learned and make even greater positive changes in students' literacy acquisition and consequent life opportunities for *all* children.

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