

Structured Pedagogy

Literature Review



A. Introduction

Learning outcomes are disastrously low for the majority of children in low- and middle-income countries (LMICs). Children are simply not learning enough to acquire basic literacy and numeracy skills, let alone be substantial economic contributors in a modernized economy. There is a tremendous amount of wastage and churn at the lower grades due, in part, to poor management and bad teaching.² Shockingly, in some countries, nearly half of the grade 2 population is unable to read a single word of a sentence or do basic numeracy, as Figure 1 shows.³ Pritchett argued that tiny numbers of students in Cambodia, Senegal, and Zambia were able to read or do mathematics at Programme for International Student Assessment (PISA) Level 4 or higher (i.e., global proficiency).⁴ For example, only five students in Zambia and four in Cambodia reached that level. Given these results, several LMICs are suffering from a massive underutilization of human capital; productive members of society are being underserved and tremendous talents are being left behind.

The World Bank has argued that 53% of children in LMICs are suffering from learning poverty and that this requires urgent action with educational improvement interventions, including structured pedagogy.⁶ More striking, 87% of children in sub-Saharan Africa are learning poor. A common explanation for the low learning outcomes was the heavy focus on increasing access to education in LMICs, with some countries like Ethiopia increasing from just over 20% primary access in the early 1990s to nearly 90% about 12 years later.⁷ Any system faced with that pace of expansion would suffer from quality concerns.

That said, it is misleading to argue that the Education For All movement was only focused on access, as the Education For All documents themselves talked about quality and learning, and Lockheed and Verspoor's key text was focused on improving outcomes.⁸

Unfortunately, low learning levels is not an easy problem to solve. At the core of it is poor instructional methods used in a preponderance

DEFINITIONS

LESSON PLANS = provides the what to teach and the how. Some lesson plans include scripting and some include steps.

SCRIPTED LESSON PLANS = lesson plans that include word for word instructions for teachers on what to say and do.

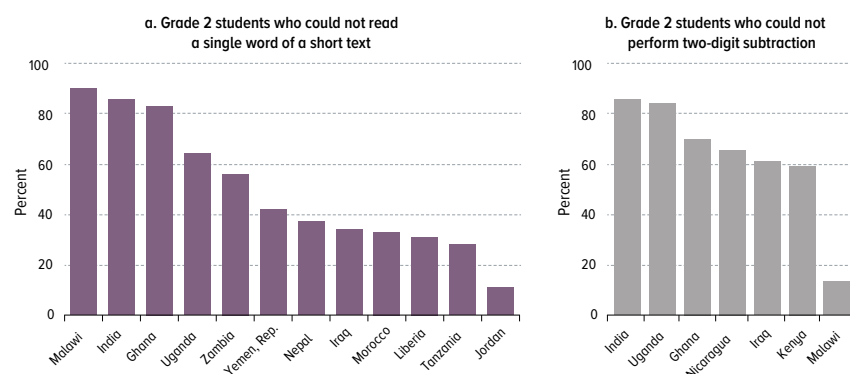
STRUCTURED PEDAGOGY = a coordinated, combined approach including lesson plans + student materials + training + ongoing support (e.g., coaching).

GRADUAL RELEASE = an instructional model whereby the teacher shifts responsibility to the students so they can eventually do the skill independently.

"I DO, WE DO, YOU DO" = a time-limited, direct instructional method of gradual release in which the teacher first models, then does the activity again with the students, and then monitors them as they attempt it alone.

*"Structured pedagogy refers to a systemic change in educational content and methods, delivered through comprehensive, coordinated programmes that focus on teaching and learning, with the objective of changing classroom practices to ensure that every child learns."*¹

FIGURE 1 Percentage of grade 2 students who cannot do basic literacy or numeracy skills⁵

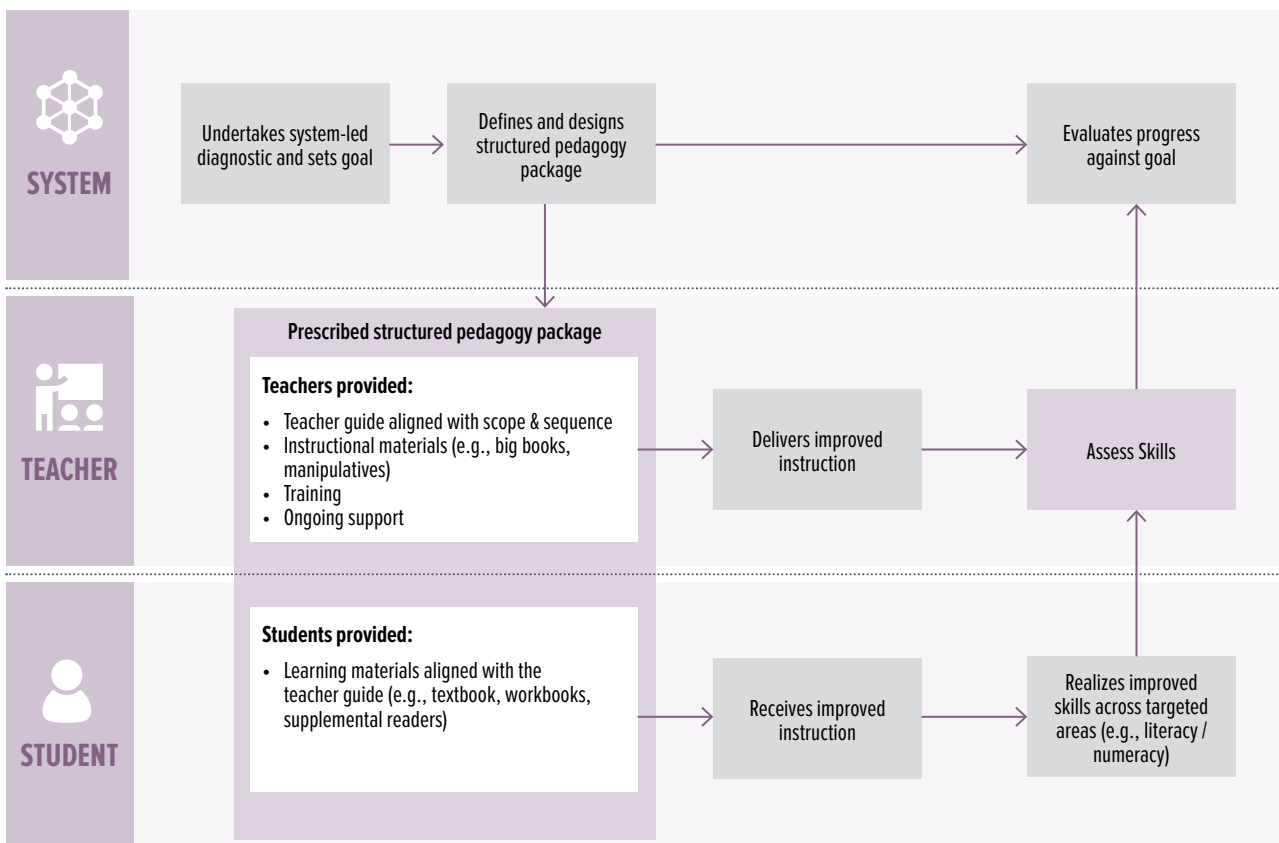




of lower primary classrooms. This is due, in part, to a mismatch of the taught curriculum and the skills of children;⁹ in part to overutilization of languages of broader communication, such as English;¹⁰ and in part to expectation that it is the curriculum content that should be taught, rather than children.¹¹ Instructional time is a problem as well,¹² as some estimates suggest that children are disserved by a dramatic underutilization of instructional time due to absence (teacher and student),¹³ tardiness, and additional time lost.¹⁴ Some of the problem, though, goes beyond time and systematic issues and relates to simple instructional quality.¹⁵ The heavy repetitive nature of much of instruction in sub-Saharan Africa is ineffective at teaching skills compared with facts,¹⁶ and combined with the limited instructional time in classrooms, it means that many children are struggling due to poor instruction. Teachers in many contexts remain largely impervious to the instructional fads that come and go in education systems,¹⁷ and experimenting at small scale has limited impact at large scale.¹⁸ It is in this context that many governments have been experimenting with various solutions and increasingly focusing on structured pedagogy interventions in foundational literacy and numeracy. **In short, what do we know? Learning outcomes in sub-Saharan Africa are disastrously low and substantial investments are required to improve outcomes at large scale in foundational literacy and numeracy (FLN).**

With these poor learning outcomes, governments seek solutions, and structured pedagogy is a framework to recommend as a means to that improvement. At its most basic, structured pedagogy is a coordinated, combined approach that includes teacher lesson plans, student materials, training, and ongoing support. Successful structured pedagogy relies on the system to ensure coordination among relevant actors (see Figure 2).

FIGURE 2: Defining structured pedagogy



Better Purpose (2020). Structured Pedagogy Roundtable pre-read.

This literature review has the following sections. First, we present a simplified history of recent structured pedagogy. Second, we present key findings from a review of the recent literature on structured pedagogy programs in LMICs. Third, we present important questions to which we do not yet know the answers in this subfield. Fourth, we conclude with links to the other guides in this series for key elements of implementing structured pedagogy.



B. History of Structured Pedagogy

Structured pedagogy has been in use for centuries. From the earliest days of formal education, instructional content has been controlled, with the student content becoming progressively more difficult throughout the school year, and providing teachers with instructional guidance to support student learning. The Ethiopian Orthodox Church used structured approaches to teaching learners the Ge'ez scriptures for hundreds of years.¹⁹ In the 1600s, curriculum materials directed European schoolmasters in what/how to teach.²⁰ In Germany in the 1830s, the Froebelian approach was highly structured, with explicit instructions and training details.²¹ Soon after in the United States, the increase in public-school access created a need for more standardization.^{22,23} From 1836 to 1920, McGuffey Readers were widely used and included features that are still recommended today, such as gradual introduction to vocabulary, word repetition, controlled sentence length, and a version of a teacher's guide.^{24,25} Horace Mann also responded to the rapid public-school expansion by promoting standardized curricula and instruction but used that influence to advocate whole-word reading instead of by sounds and letter.²⁶ But by the late 19th century into the early 20th, John Dewey was arguing that content should be more fluid and respond to a student's interest.²⁷ In the early 1900s, Montessori schools had a highly specified set of activities, materials, and methods.²⁸ In the 1920s and 1930s, teacher materials suggested activities, ideas for motivating, and discussion points; and by the 1940s, they started to include reproduced student work.²⁹ In the mid-20th century, Piaget's work on developmental levels became familiar to educators and now serves as a theoretical foundation for new instructional content to be built on existing knowledge. In 1949, the Tyler Rationale was described,³⁰ which centered on four concepts that persist in today's instructional materials: (1) purpose or objectives, (2) suggested experiences to achieve the objectives, (3) organization for efficiency, and (4) guidance on evaluating learning experiences (i.e., informal assessment). Materials emerged organized around these concepts to accommodate teacher abilities. Many post-colonial education systems in sub-Saharan Africa used various types of basal readers to drive literacy skill development, and pedagogical methods focused on adherence to utilizing these materials on a daily basis.

In the 1960s instructional materials in the United States shifted from broad to discrete skills.³¹ For example, DISTAR was a predecessor to Mathematics Mastery, and Reading Mastery was developed with explicit directions and lengthy scripts, targeting majority minority and low socioeconomic status schools.³² Soon other publishers created similar materials.³³ In the 1980s, there was movement toward more rigorous school reform, and scopes and sequences evolved from a few specific skills to hundreds of discrete skills.³⁴ The instructional materials of Success for All were highly structured, and students were grouped by ability. In addition, Success for All included ongoing monitoring and various support mechanisms to help teachers implement the heavily scripted program effectively.³⁵ In the 1990s, once again, there were efforts to improve education and standards, and charter schools using detailed scripts began to emerge. Structured pedagogy's use in the United States strengthened in the early 2000s following the passage of the No Child Left Behind Act (2002),³⁶ which required states receiving Reading First funding to have a program that was scientifically based and included the essential components of reading outlined by the US National Reading Panel.³⁷ This requirement was interpreted as a packaged reading program, and 97% of the funding went to instructional materials and training.³⁸ At the same time, other national calls for increased standardization and structure were seen in the United Kingdom with the influential Rose Report³⁹ and in Australia.⁴⁰ At the turn of the recent century, under the National Literacy Strategy, the United Kingdom mandated structured pedagogy, and its influence was realized in just four years, when the percentage of students across the country achieving target literacy levels rose 12% (from 62% to 74%).⁴¹ By 2010, nearly two thirds

HISTORY OF STRUCTURED PEDAGOGY



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Pre-1600s Ethiopian Orthodox Church uses structured approach for Ge'ez scriptures

1600's European materials direct what/how to teach

1830's Froebelian approach

1836 to 1920 McGuffey Readers

1900s Montessori specified activities, materials, methods

1920s to 1940's teaching materials suggest activities

1949 the Tyler rationale, four curriculum concepts

1960's shift from broad to discrete skills

1980's Singapore more structured approach

1980's discrete skills expand

2000's US Reading First funding

2006 UK Rose Report

2010's curriculums compared

2010's Vietnam & China structured approach

2019 donors recommend structured pedagogy



of all U.S. elementary schools were using a core reading and math program. In the decade since, external comparisons and transparency of curriculum packages are increasingly available.^{42,43} From these comparisons, we know that the literacy programs that are most effective are those that provide explicit instruction on the relationship between sounds and symbols systematically. In Singapore, which is often touted for a very strong mathematics program, textbooks were largely imported until the early 1980s. At that point, government officials decided to mandate a more structured approach, creating focal departments within the Ministry of Education to develop and coordinate a national curriculum, including a syllabus; oversee assessment, teaching practices, and teacher's guide development; and develop textbooks.⁴⁴ Countries such as China and Vietnam have made substantial progress in national learning outcomes in the past decade using structured instructional approaches.⁴⁵ In Shanghai, where schools are recognized for their successful student outcomes,⁴⁶ they use many elements of structured pedagogy. The Shanghai model balances structure and autonomy, meaning that teachers put their own touches on the lesson plans that follow a prescribed structure (M. Crawford, personal communication, October 16, 2020).

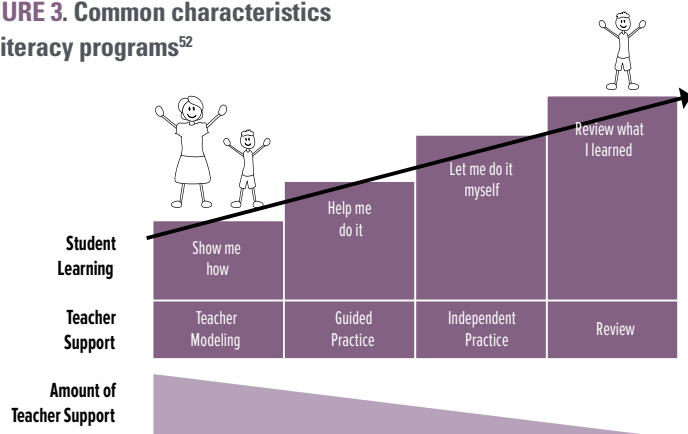
Most recently, structured pedagogy has been described by international scholars⁴⁷ and the instructional model recommended by the Global Reading Network⁴⁸ for use in international literacy programs funded by the United States Agency for International Development (USAID). Table 1 presents the characteristics of structured pedagogy according to Kim and Davidson.⁴⁹

Over the past 150 years, the common characteristics that have emerged in teacher's guides used in structured pedagogy include: (1) direct explanation, (2) modeling (i.e., demonstrate), (3) guided practice (i.e., scaffolding), (4) independent practice (i.e., application), (5) formative assessment (6) discussion (i.e., student talk), and (7) monitoring (i.e., attend to student response). Figure 3 presents a graphical display of how these common characteristics looked in literacy programs, comparing how much teacher support was provided and how much children learned in each of these common characteristics.⁵¹ Over the decades, common components such as pacing calendars, daily lesson plans, model lessons, textbooks, teacher editions, student books, supplemental materials, and professional development have been combined to support teachers to improve their instruction. Individual structured pedagogy programs have different combinations of these characteristics and components, and the purpose of this literature review is to describe, in general, how these interventions have worked.⁵²

TABLE 1. What is structured pedagogy? Maximizing instructional time⁵⁰

1. Practicing systematic and explicit instruction
2. Establishing instructional routines
3. Providing scaffolding
4. Making assessment-informed decisions
5. Fostering social and emotional learning and engagement

FIGURE 3. Common characteristics of literacy programs⁵²



Throughout the history of its use, structured pedagogy has had mixed reactions. Critiques of structured pedagogy in the past have come from both researchers and theorists. For example, those who adhered to Froebel's method were described as "cult-like"; Montessori practices were "ritualized"; while scripted lesson plans have been labeled reductionist or as contributing to deskilling.^{53,54,55} Other concerns are that teachers and students are being managed and manipulated with too much teacher talk^{56,57} and insufficient autonomy to make judgments. Some leaders in LMICs argue that structured pedagogical programs are neocolonial and that teachers and students should have the opportunity to develop their own

instructional pathways, including using teaching to create societal change.⁵⁸ Critiques of structured pedagogy are further discussed below under point 11.

Meanwhile the users of these materials, the teachers, often have a more nuanced reaction to the provided materials. Beginning teachers and those new to the subject of math or reading say the materials give them confidence in the content and the appropriate sequencing.^{59,60} Most importantly, teachers say they like them because they see their students learning. Plus, the provided content and the suggested activities save them preparation time, freeing them to make adjustments and to be more creative.^{61,62} The most typical teacher complaints are that the materials have too much content and do not align with the abilities of all of their students.^{63,64}

C. What We Know about Structured Pedagogy in LMICs

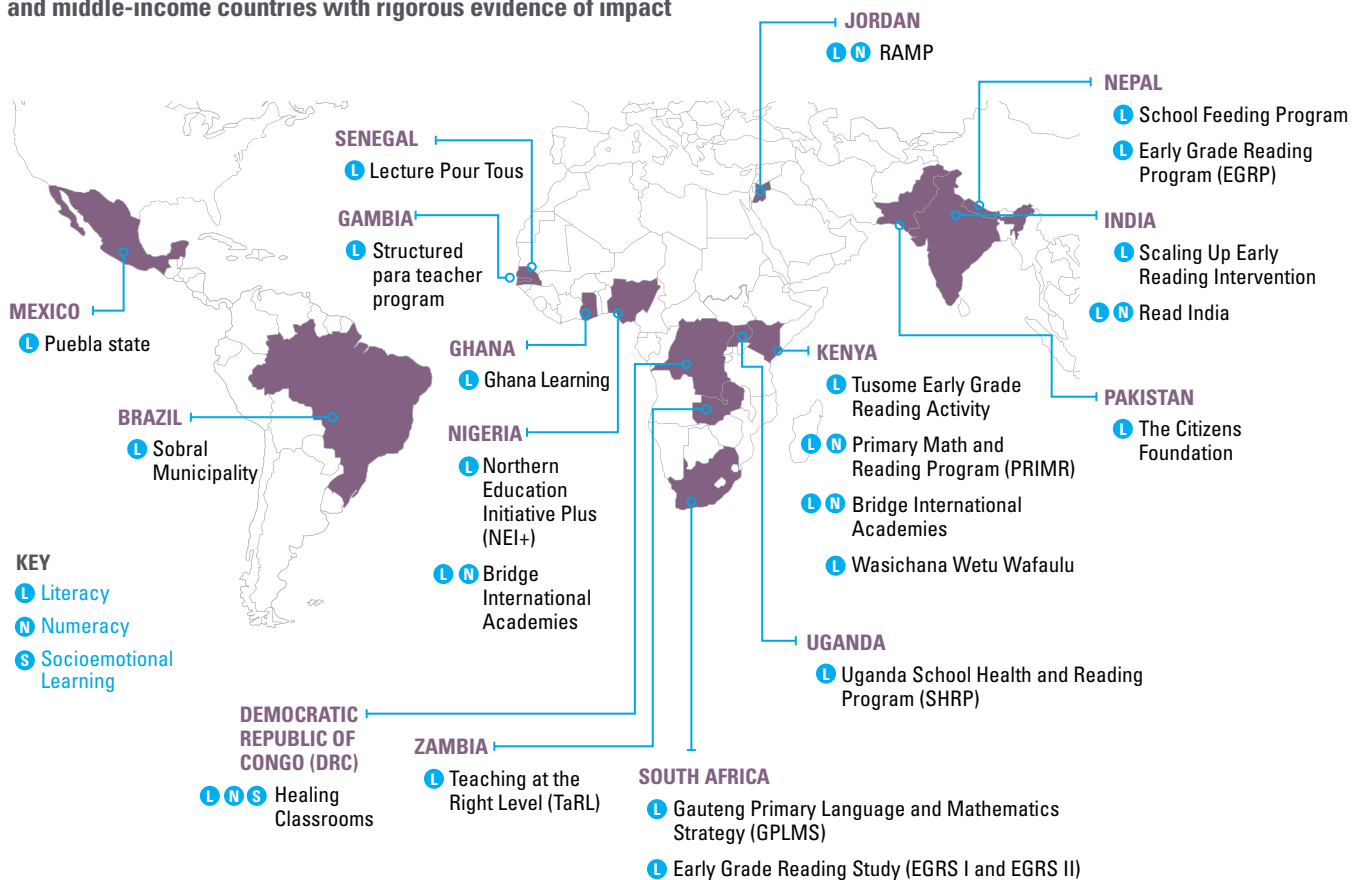
Structured pedagogy programs are relatively recent innovations in LMICs, though not to the education sector more broadly, as we have shown above. The past decade has seen a boom in the rigorous evidence available on structured pedagogy programs in this sector, and we have organized this section of the literature review to present the areas where there is strong evidence regarding structured pedagogy and those areas where the research remains unclear.

1) Structured Pedagogy Programs in LMICs Can Have Large Impacts

Structured pedagogy interventions have been implemented to improve the low learning outcomes described in the Introduction. These interventions build on what is known in how to implement effective FLN interventions from predominantly Western countries outlined above. Figure 4 shows the set of large-scale effective structured pedagogy programs that we are aware of in LMICs. These programs have some design differences, but in general they show substantial impacts on learning. Several meta-analyses show that structured pedagogy programs have substantial impacts on learning outcomes in LMICs^{65,66,67,68,69,70,71,72} and sub-Saharan Africa⁷³ and that these structured pedagogy types of programs have larger impacts on learning than many other alternative technical intervention designs.^{74,75}

Figure 4 depicts where effective large-scale FLN programs have been implemented. It indicates the country; the name of the program; and whether the program supports literacy, numeracy, literacy and numeracy, socio-emotional learning, or all of those subjects.

FIGURE 4. Recent, large-scale, structured pedagogy programs in low and middle-income countries with rigorous evidence of impact



More work must be done to determine how to interpret the gains from structured pedagogy programs. It is important to determine whether the magnitude of effects identified from structured programs resulted in meaningful impacts (Figure 5).^{76,77,78,79,80,81,82} (See endnote 76 for guidance on interpreting effect sizes). We found that, in fact, the magnitude of structured pedagogy impacts was substantial. Figure 5 shows that the average 0.44 effect size independently identified in two recent reviews of recent structured pedagogy programs was larger than the 90th percentile effects of programs implemented in sub-Saharan Africa. More detailed explanations of effect sizes and percentile effects are included in note 76. Two caveats are noted. Not all programs that are characterized as structured pedagogy will necessarily be effective, because design, implementation quality, and buy-in are also necessary; but this evidence provides significant hope that it is possible to improve outcomes. It is also worth noting that large-scale structured pedagogy programs will require time to show impact, potentially several years, given the complexity of the interventions and the multiple moving parts.⁸⁵

The Smart Buys document published by the Global Education Evidence Advisory Panel⁸⁷ evaluated programs using Learning Adjusted Years of Schooling (LAYS), rather than effect sizes. LAYS expresses program impacts in additional years of schooling, and the Smart Buys document showed that structured

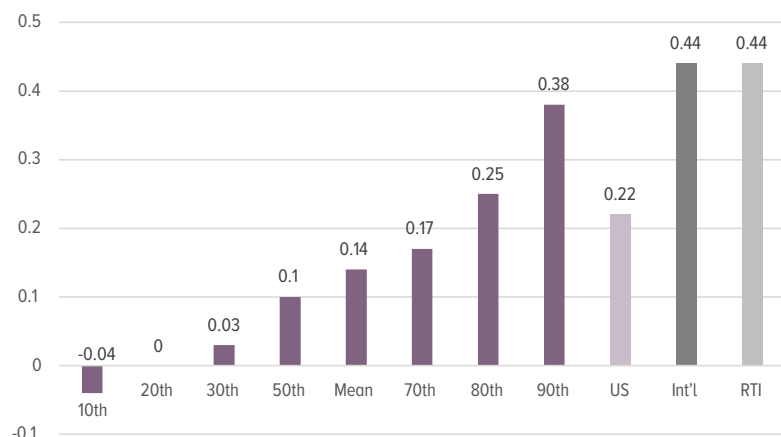
pedagogy programs have substantial impacts, among the largest of any category. Only giving information on the effects of education and teaching at the right level programs have similar or larger average impacts. Some of the structured pedagogy programs the Panel examined were among the most impactful, but also the most cost-effective, in the sector.⁸⁸ Several recent meta-analyses have been undertaken to examine the impact of programs,^{89,90,91,92,93,94,95,96,97} but only the GEEAP Smart Buys document differentiated structured pedagogy interventions from other activities focused on improving outcomes, and GEEAP argued that structured pedagogy should be considered a Good Buy for policy makers in the sector given its impact and cost-effectiveness. Only Teaching at the Right Level (TaRL) interventions also have similar evidence on improving FLN outcomes at large scale according to GEEAP,⁹⁸ and there are substantial overlaps between structured pedagogy and TaRL.

The Learning at Scale study, funded by the Bill and Melinda Gates Foundation with support from the Center for Global Development (2019–2022), was tasked with identifying large-scale, highly effective interventions.⁹⁹ The Learning at Scale team worked with donors, implementers, and country counterparts to identify programs that met basic criteria. We noted above that these highly effective programs have been funded primarily by a handful of donors, but more interesting was that seven of the eight programs were structured pedagogy programs. The interim report describing the design and impacts of these programs will be available in early 2021. **In short, what do we know? Structured pedagogy programs can have substantial impacts on learning including at scale.**

2) Structured Pedagogy Programs Can Have Large Effect Sizes That May Mask Small Actual Gains

Although the section above shows that the magnitude of the impacts of structured pedagogy programs can be substantial from an effect size point of view, the apparent impact of some of these programs can be somewhat misleading. It is a vestige of how effect sizes are calculated and the large number of children with learning outcomes that are assessed to be zero. In fact, given the low levels of learning in LMICs, programs with large effect sizes can actually have relatively modest impacts on meaningful learning metrics.¹⁰⁰ In some contexts, structured pedagogy programs can reduce the proportion of children who have very low levels of learning quite substantially, resulting in high effect sizes, but have relatively small impacts on the portion of children who could read or do mathematics successfully before or without the program. This is tautologically in part because of the low levels of initial learning. **In short, what do we know? Structured pedagogy programs have some of the largest impacts on learning outcomes in LMICs, although the practical impacts on learning remain somewhat modest in some countries.**

FIGURE 5. Effect size comparisons^{84,85,86}





3) Structured Pedagogy Programs Work in Lower Performing Contexts and to Simplify Complex Skills

Structured pedagogy programs have stronger evidence in particular parts of the education system. For example, the evidence is strong that structured pedagogy programs work in lower-performing contexts. Mourshed, Chijioke, and Barber argued that the structured pedagogy program methods work best in helping education systems move from poor to fair by providing scaffolding for lower skilled educators.¹⁰¹ With a broader frame applied, we can see that there is evidence of structured pedagogy's effectiveness in both rich countries and LMICs,^{102,103,104} although it is worth noting that structured pedagogy programs seem to be more in demand in contexts where there is a perception of low achievement. Structured pedagogy programs also seem to be more frequently utilized when the skills in focus are ones that are foundational to future learning, with lower primary literacy and numeracy being of particular interest.^{105,106,107,108,109,110,111,112,113} Teaching children to read is complex, and having a structured program is a potentially impactful intervention in contexts with limited training and low initial qualifications. This theory of the situation is relevant in the United States, as the structured pedagogy evidence is stronger in lower primary education and early childhood education. **In short, what do we know? Structured pedagogy programs have stronger evidence of effectiveness in lower-performing contexts and where the foundational skills required by teachers are particularly complex.**

4) Structured Pedagogy Programs Typically Include Elements that Align with Research on the Science of Learning

The science of learning is an interdisciplinary effort that crosses fields such as cognitive psychology, education, neuroscience, and technology.¹¹⁴ It consolidates information from controlled environments (e.g., labs) and field research (e.g., classrooms) to inform educational practice. One aspect the science of learning addresses is how humans acquire new knowledge, which is where structured pedagogy aligns with the science. That is, many principles that the science of learning research has detailed^{115,116} are realized through structured pedagogy approaches. Table 2 cross-walks the correspondence.

TABLE 2. Relationship between the science of learning research and Structured Pedagogy programs

SCIENCE OF LEARNING	REALIZED IN STRUCTURED PEDAGOGY
Children learn new ideas through connections to what they already know.	A carefully planned scope and sequence (see Guide 3) helps to ensure that students have the prior knowledge they need to master new ideas.
Learning involves moving information from working memory—which has limited capacity—to long-term memory.	Teacher's guides (see Guide 4) offer explanations, modeling, and appropriate examples to avoid overwhelming students.
Solving complex problems requires having basic skills available in long-term memory.	Teacher's guides include instructional methods (e.g., phonics) that ensure students acquire the basics so they can focus on the more complex skills (e.g., comprehension).
Retention of new ideas requires practice.	Learning materials supply content for both initial acquisition and review of those ideas.
Examples help with learning new ideas, but students can still find it difficult to understand the underlying concept.	Learning materials should include both abstract representations (e.g., mathematical calculations) and concrete examples (e.g., word problems).
Gaining new knowledge and skills requires effective feedback to students.	Teacher training (see Guide 5) and ongoing support help teachers to provide constructive feedback.

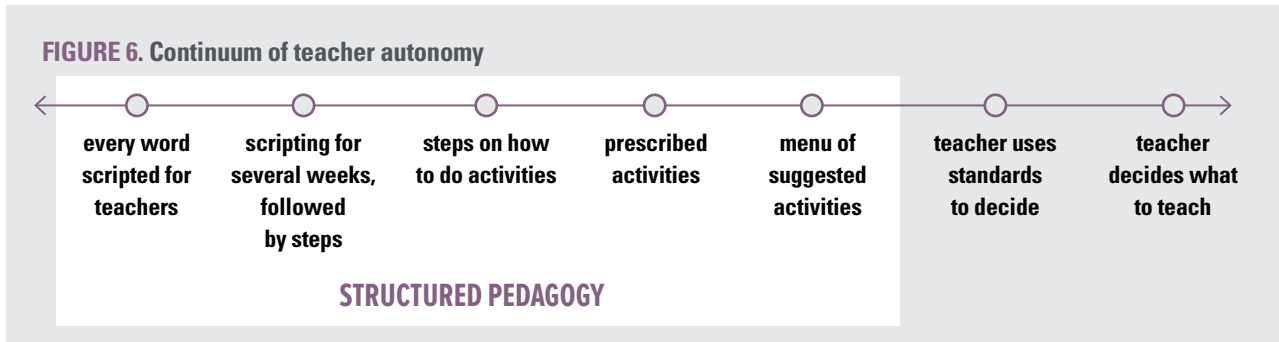
Although structured pedagogy commonly includes elements that are described in the science of learning, program designers should consider including ways to support other areas that also contribute to learning, such as autonomous motivation. Students achieve autonomous motivation by acquiring competency for the task (i.e., self-efficacy, a connection to others (i.e., relatedness), and choice (i.e., autonomy). Structured pedagogy programs focus primarily on ensuring that students can do the task but do not typically address relatedness or autonomy. **In short, what do we know? Structured pedagogy programs include elements that align with the science of learning research but do not include all areas.**

5) Structured Programs Are Often Criticized for Reducing Teacher Decision-Making, But Good Structured Pedagogy Programs Expect Teachers to Make Adaptations

Structured pedagogy programs are typically criticized for reducing teacher decision-making and being perceived as teacher proofing. There are some programs for which that is a fair criticism,¹¹⁷ but the evidence does not suggest that all structured pedagogy programs are overly scripted.¹¹⁸ Qualitative research from Malawi examined how teachers introduced

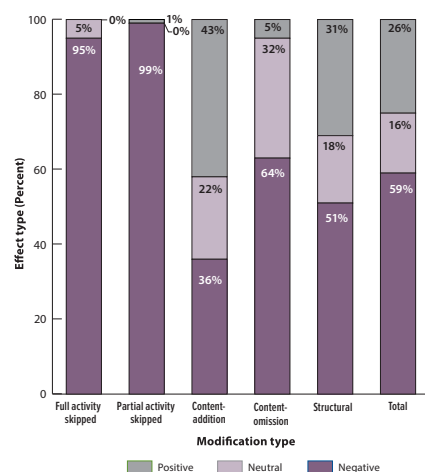


adaptations to lessons, including using continuous assessment results.¹¹⁹ A multi-country study of teacher’s guide utilization in LMICs examined the modifications that teachers made to the teachers’ guides and found that most of the changes reduced the quality of the lesson,¹²⁰ so we would not recommend adaptations for adaptation’s stake. The teacher’s guide in the structured pedagogy program should be seen as a scaffold, a support to build the skills of teachers as they grow more comfortable with the pedagogical methods that improve outcomes. See Figure 6 to see where structured pedagogy falls in a continuum of teacher autonomy.



Some programs expect teachers to follow the teachers’ guides quite closely, while some programs train teachers on how to make adaptations, how to know when to reteach lessons, and how to build from the frame of the lesson to expand particular programs. The latter method requires more from trainers and teachers. The type of training required to ensure that these adaptations are sound is complicated, but effective structured pedagogy programs should focus on this aspect. It should be noted that some programs do actually provide lesson plans to a level of detail that might be counterproductive, as RTI International’s teacher’s guide study showed a slight negative relationship between the level of scripting and program impacts.¹²¹ In other words, while having structured materials can make a difference, too much scripting is somewhat counterproductive. Figure 7 shows the findings from the multi-country study of teacher’s guide use and the types of changes that were made. That study found that only 26% of classroom modifications away from the teacher’s guide lesson plan were positive, and the majority were negative (59%). Although not all teachers followed this pattern, teachers needed more support so that the modifications they made to the teacher’s guide lessons improved the lesson. Until that is the case, teachers should be encouraged to follow the lesson plan so that they learn the instruction routines effectively. **In short, what do we know? Structured pedagogy programs should be designed to provide enough guidance to teachers on how to make adaptations.**¹²²

FIGURE 7. Percentage of negative modifications¹¹⁹



6) Structured Pedagogy Programs Use of Teachers’ Guides Can Improve Pedagogical Content Knowledge

Debates have raged for decades on how best to develop pedagogical content knowledge for teachers.¹²³ In LMICs, should the professional development programs directly provide new pedagogical content knowledge ideas to teachers? Or should they provide practice and support for implementation of pedagogical changes that require pedagogical content knowledge? The structured pedagogy program experience shows that it is possible to improve pedagogical content knowledge using a focus on instructional behavior and daily teaching rather than a heavy focus on overly complicated pedagogical content knowledge. For example, the Health and Literacy Intervention (HALI) in coastal Kenya provided a teacher’s manual with daily lesson plans, training, and ongoing support via text messages. One year of being in the structured program had a large (1.07 SD) effect on teacher knowledge of pedagogy.¹²⁴ In another example, the Primary Math and Reading Initiative (PRIMR) mathematics program in Kenya was able to examine the impacts of PRIMR on procedural and conceptual mathematics programs.¹²⁵ While not designed primarily to develop conceptual mathematics pedagogical content knowledge among teachers, the program had a 0.33 SD impact on conceptual mathematics for grade 2.

A benefit of structured pedagogy programs has been found in professional development for teachers. These materials support teachers with new content or strengthen their existing knowledge.^{126,127} And they are a logical solution to address teachers who may be new to a subject or grade level.^{128,129} The model lessons strengthen their delivery and the planned




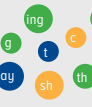



sequencing helps teachers learn how to anticipate and interpret students' responses or actions for a particular instructional activity.^{130,131} (Benefits to teachers are also discussed below under point 7.)

Another key benefit of structured programs is that teachers can more easily build automaticity with lessons and activities. Automaticity is useful because adult brains can only pay attention to a limited number of items or tasks at one time. This is called cognitive load. When the brain has too much load, it will stop processing some items in order to focus on others. Teachers are paying attention to the activity, the materials, student behavior, student learning, and other aspects of the classroom at the same time. If teachers have a more structured lesson plan that is predictable, their brains may focus less on the activity steps and have more space to focus on student learning, the relationship between their pedagogical choices, and how to most effectively improve instruction.¹³² **In short, what do we know? Structured pedagogy programs can improve pedagogical content knowledge and increase automaticity, even without primarily focusing on providing that training to teachers explicitly.**

7) Structured Pedagogical Programs Require Investments of Technical Skills

Successful structured pedagogical programs require substantial investments in the technical development of the teacher and student materials.^{133,134} Simply determining that the country needs lesson plans and student books is not nearly sufficient.¹³⁵ In fact, Piper, Sitabkhan, Mejia, and Betts¹³⁶ found that the design of the teacher's guide, the relationship to the student books, and the level of pacing inherent in the materials make a difference in the magnitude of the impacts on learning. A study in Mongolia showed that the impacts of books were amplified when implemented alongside a teacher professional development program.¹³⁷ Not all of these comparisons between particular elements of reading materials have rigorous evidence, but one study mentioned above suggested a slightly negative relationship between the level of scripting and learning outcomes.¹³⁸ The quality of materials seems to matter quite a lot, though it should not be construed to mean that the effectiveness of structured pedagogy is only about materials. Models of quality materials development can guide the sector. For example, several organizations—such as SIL LEAD, Funda Wande, and Room to Read—have been able to develop high-quality materials with government counterparts. We describe in Guide 4, on materials development, how these materials are developed most effectively. It is worth noting here that the skill is not in developing the best materials (student books and corresponding teacher guides), but instead and more importantly, the best materials that can be approved against the existing government curriculum. Those curricula are not always structured in ways that will maximize early learning, so the question is to balance the perfection in those materials with the relationships needed to work with government and with the basic quality characteristics required to make a meaningful impact on learning. Figure 8 presents Kim and Davidson's model for how key skills are developed over the first three years of a structured pedagogy program.¹³⁹ And the recently developed Global Proficiency Framework (see Guide 3) can be a resource as it defines the minimum proficiency levels students are expected to obtain from grade one through grade nine for reading and mathematics. **In short, what do we know? Program impacts differ by the quality of structured pedagogy materials, and it requires technical knowledge to write them well and political economy skill to get quality materials approved within a government context.**

FIGURE 8. Model of key skills development¹³⁷

Explicit and Systematic Instruction		Year 1	Year 2	Year 3
Print Rich Environment	 Phonological Awareness	Know that words are made of sounds. Can manipulate sounds (e.g. syllables, rimes, phonemes).		
	 Phonics	Know letter names and sounds. Understand the organization and basic features of print.	Can decode and spell words with common orthographic patterns. Know and apply grade-level phonics and word analysis skills in decoding simple words.	Can decode and spell words with less common, complex, or inconsistent patterns.
	 Fluency	Develop fluency with letter knowledge and phonological awareness.	Read simple texts orally with accurate, appropriate rate, and expression to support comprehension.	Read texts orally with accurate, appropriate rate, and expression to support comprehension
Language Rich Environment	 Vocabulary	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade-level access	Use frequently occurring affixes and root words as a clue to meaning of a word	Use knowledge of the meaning of individual words to predict the meaning of compound words. Choose context as a clue to the meaning of a word or a phrase.
	 Comprehension	Retell familiar stories, including key details. Answer questions about key details in a text.	Retell stories, including key details and central message; and ask and answer questions about central message, key details, and who, what, where, and when.	Describe main ideas and key details and their relations. Ask and answer such questions as why and how to demonstrate understanding of key details in a text.

Vocabulary and comprehension skills initially develop in the context of an oral language, and continue to develop in the context of reading

8) Structured Pedagogy Program Design Differs by Subject and by Other Characteristics

Structured pedagogy programs have several similarities, which we have described above. They also have some characteristic differences. Structured pedagogy programs differ by subject, as we show in Table 3. There are programs that are literacy only, numeracy only, literacy and socioemotional learning, literacy and numeracy, and literacy, numeracy alongside of social-emotional learning. Because of the growing understanding that socioemotional learning is an important contributor to outcomes in other learning areas, more programs now include social-emotional learning in their design. To ensure that social-emotional learning continues to be included in program designs, more should be done to isolate its influence on academic outcomes as the research is minimal. Note that the subjects that are included in the structured pedagogy program have implementation considerations. Some have been using the “I do, we you, you do” method for literacy¹⁴¹ as well as numeracy (PRIMR), whereas most math education experts have argued that this linear structure for mathematics is inappropriate.¹⁴² Yet the overarching concept of gradual release (i.e., shifting responsibility from the teacher to students) is relevant to math exploration and other higher-order skills and can be included in a teachers’ guide, a hallmark element of structured pedagogy; see Figure 9. Overall, in a structured pedagogy program it is recommended that teachers use direct instruction to introduce new skills (e.g., formal algorithm or the sound of a letter) but what happens after the introduction depends on the specific activity.

There are structured pedagogy programs applied to different levels of the education system. Preprimary and lower primary structured pedagogy programs are most typical, with fewer programs at the upper primary and secondary levels.

TABLE 3. Structured pedagogy programs by program characteristic

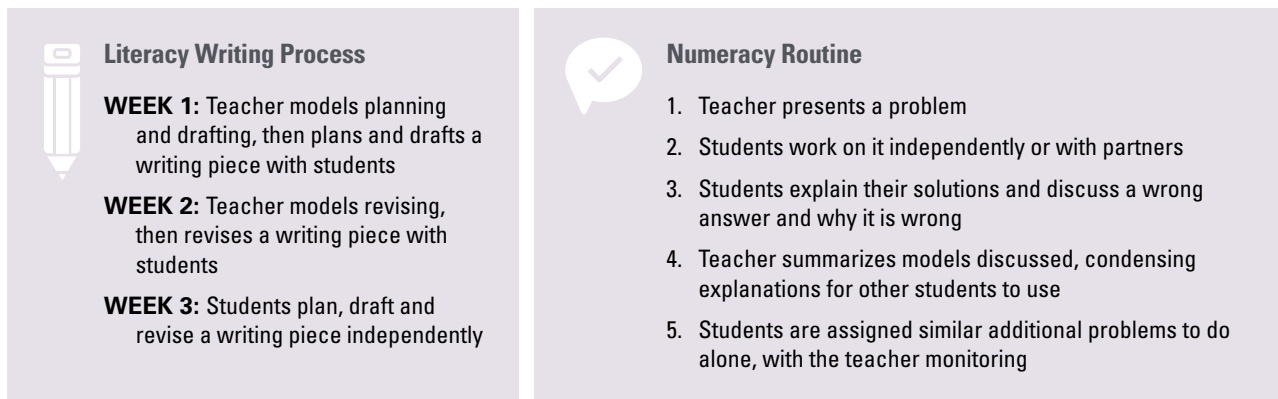
PROGRAM CHARACTERISTIC	DESIGN	PROGRAM EXAMPLE	KEY LEARNING
Subject	Literacy only	Ghana Learning ¹⁴³	How to implement mother-tongue interventions when countries want English
	Numeracy only	Kenya Primary Education Development (PRIEDE) Project	Scaling a multi-subject program with limited training time
	Socioemotional learning’s impact on literacy	Healing Classrooms in the Democratic Republic of Congo (DRC) ¹⁴⁴	Statistically significant only at .10 level for literacy; no impact on numeracy
	Literacy and numeracy	Gauteng Primary Language and Mathematics Strategy (GPLMS), ¹⁴⁵ PRIMR Initiative ¹⁴⁶	A more nuanced understanding of how to use gradual release in mathematics
	Literacy and numeracy and social-emotional learning	Ahlan Simsim in Lebanon, Iraq, Lebanon, Syria, and Jordan	Possibilities for meaningful impacts at scale of nurturing care interventions
Level	Pre-primary	Ghana, ¹⁴⁷ Tayar ^{148,149,150}	What learning areas are most likely to show impacts?
	Lower primary	Many meta-analyses ^{151,152,153,154,155,156,157,158}	Most structured pedagogy evidence in the sector comes from this level
	Upper primary	Upper primary brief ¹⁵⁹	Limited evidence of the impacts of structured pedagogy in upper primary
	Secondary	Sierra Leone ¹⁶⁰	Effective pilot in Sierra Leone, but small scale
Language	Mother tongue only	Nigeria Northern Education Initiative+, ¹⁶¹ Ghana Learning ¹⁶²	What about language transition?
	Second language only	Ghana Learning add-on; ¹⁶³ Early Grade Reading Study (EGRS), English second language schools ¹⁶⁴	Are impacts on the second language equitably distributed?
	Bilingual	Tusome; ^{165,166} School Health and Reading Program (SHRP) ¹⁶⁷	Integrating the languages is complex
	Trilingual	PRIMR mother tongue ¹⁶⁸	Not enough time to test how the trilingual works on language transition
	Late exit bilingual	Reading for Ethiopia’s Achievement Developed Technical Assistance (READ TA) ¹⁶⁹	Mother tongue has impacts on learning, but what is the relationship with global competitiveness with weak second language skills?

Another question that does seem to have been answered is whether structured pedagogy programs can work using different



language choices. There are medium- to large-scale programs that show impacts on learning outcomes that are mother tongue only,^{170,171} second language only, bilingual,^{172,173} trilingual,^{174,175} and even late-exit bilingual.¹⁷⁶ The effectiveness of the late-exit bilingual interventions at scale seems to be somewhat contested, however, as the experience with some literacy programs as they transition to upper primary calls into question whether the structured pedagogy interventions did enough in the early years to prepare for the transition year. **In short, what do we know? Structured pedagogy programs have proven to be relatively durable in their impacts, with several showing impacts across various subjects, across various levels, and across various language designs. Some of these evidence areas are weaker, however.**

FIGURE 9. Gradual release with higher-order skills



9) Structured Pedagogy Research Has Given Some Guidance on What Ingredients Are Necessary

If we knew what ingredients of structured pedagogy programs were most essential to improve learning outcomes, it would be substantially easier and more cost-effective to implement. It might be that programs are implementing a wide range of program components, not all of which are needed. Fortunately, some work on program ingredients for structured pedagogy programs is available. Table 4 presents some of the summaries of that work. A randomized controlled trial in Mongolia showed small to negligible impacts of books and teacher training alone, respectively, but meaningful impacts on learning from books and training together.¹⁷⁷ Based on the Kenya PRIMR study, adding textbooks to training with coaching mattered, and the biggest additional impacts came from adding teacher's guides with lesson plans.¹⁷⁸ The EGRS contributed knowledge about what type of coaching model works best.^{179,180} Fleisch argued that the "triple cocktail" comprises the essential ingredients of program materials, including structured materials with lesson plans, teacher training, and coaching.¹⁸¹ The mixed-methods EGRS showed that coaching had to be included in the program ingredients, because the impacts were larger and more cost-effective with coaching costs included. The field of researchers and implementers has not created all the possible combinations of ingredients, but there has been consensus on some things in the sector. The relative importance of assessment as an ingredient in structured pedagogy programs remains unclear, because many programs include either learning outcomes evidence or continuous assessment by teachers in the intervention design. **In short, what do we know? Many successful structured pedagogy interventions include some combination of student materials, teachers' guides, teacher training, and teacher support such as coaching.**



TABLE 4. Program ingredients and findings

STUDY	INGREDIENTS TESTED	KEY LEARNING
Kenya PRIMR ingredients ¹⁸²	Training with coaching, + new textbooks, + teacher's guides	Textbooks matter, but teacher's guides make a big difference
Kakuma refugee camp ¹⁸³	English only or English + Kiswahili	English makes a difference, but Kiswahili is also effective
Kenya PRIMR Information and Communication Technology (ICT) ¹⁸⁴	Tablets for coaches, tablets for teachers, e-readers for students	Tablets for coaches are just as effective as tablets for teachers and e-readers for students, and more cost-effective
Experimental evidence from Mongolia ¹⁸⁵	Books only, teacher training only, books and training together	Books and training have negligible impacts on outcomes alone, but substantial gains together
EGRS ¹⁸⁶	Lesson plans and learning materials compared with lesson plans, learning materials and coaching	Randomized controlled trial evidence suggested that the program that included coaching was more effective and more cost effective
EGRS	Materials and on-site face to face coaching ¹⁸⁷ compared with materials and virtual coaching ¹⁸⁸	Initial results showed that a virtual coaching model was no less effective than on-site coaching, but longer-term results showed that face-to-face coaching had more enduring impacts

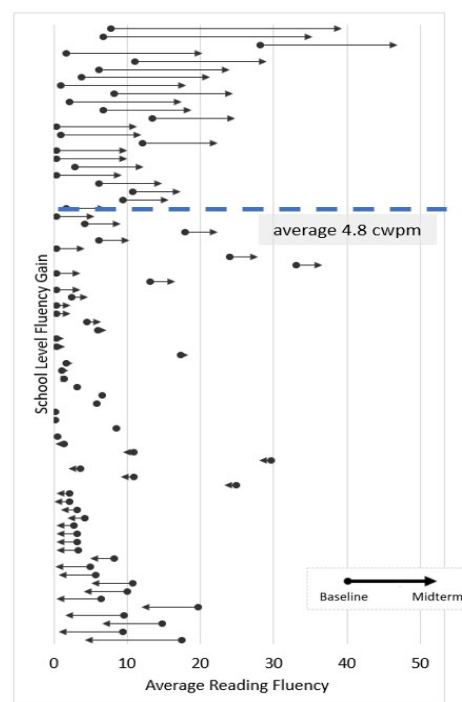
10) Structured Pedagogy Program Impacts Depend on Implementation

Section 1 above suggests that the average effects of structured pedagogy programs can be substantial. These average outcomes mask significant variation. The evidence suggests that these programs are not a magic elixir, and some interventions might not work at all. The Gates Foundation Learning at Scale researchers found that although many donors aimed to improve learning outcomes, including using structured pedagogy methods, some large donors had no programs that achieved meaningful impacts on learning at scale. Some of these programs did not have publicly available data, but it was notable that none of the interventions funded by the World Bank or the Global Partnership for Education had meaningful enough impacts on learning to be considered for Learning at Scale research.¹⁸⁹ This finding suggests that although structured pedagogy programs can work, it is how they are implemented that determines that impact.

Many would argue, of course, that the quality of structured pedagogy programs and their implementation fidelity work together, because programs that are more effective are more likely to be adhered to. Some initial evidence indicates that the main difference between programs that have substantial average impacts on learning and those that do not is primarily the proportion of schools that actually implement the program consistently. For example, at midline, the Nepal Early Grade Reading Program (EGRP), which used structured pedagogy methods, found that the gains came primarily from about one-third to one-half of the schools,¹⁹⁰ while another one-third of schools did not show any gains (Figure 10). A small follow-up qualitative study indicated that the schools that showed the most gains, compared to those that did not show any, were those that implemented more of the program as expected.¹⁹¹ On the other hand, Piper, DeStefano, Kinyanjui, and Ong'ele¹⁹² found that the Tusome program in Kenya saw more than 80% of teachers consistently teaching the lessons nearly 80% of the time. Implementation quality, in addition to the design of learning materials and the effectiveness of training, likely was largely responsible for the meaningful gains in the country.¹⁹³

In addition to the proportion of teachers and schools that were consistently implementing, implementation fidelity was a critical aspect of program impact. The Ghana Learning intervention in literacy focused heavily on implementation fidelity. The Ghana Learning evaluation showed how implementation fidelity in the Ghana Learning program changed from baseline to midline to endline across four key metrics. The Ghana Learning treatment group substantially increased the use of student textbooks,

FIGURE 10. Nepal Early Grade Reading Program, school-level changes, 2016–2018¹⁹²





scripted lesson plans, and teachers' guides, compared to the comparison group, between the baseline and endline. On the other hand, the treatment group did not focus on workbooks, and utilization of those materials declined.¹⁹⁴ This experience in Ghana shows that it is possible to work toward substantial implementation fidelity at large scale and that with a heavy focus on a few key behaviors, it is possible to support teachers in the teacher behavior change process and impact learning. **In short, what do we know? Structured pedagogy program impact depends on implementation fidelity and program take-up by teachers. It is not a magic elixir and requires an emphasis on effective implementation.**

11) Structured Pedagogy Programs Have Critics

Structured pedagogy programs have substantial impacts on learning, as we have shown, but they sometimes face resistance. A teachers' union conglomerate organization has been critical of one particular group of schools in part because of their utilization of heavily scripted lesson plans provided on tablets.¹⁹⁷ The issues raised in other countries have included concerns about teacher-proofing and the views that these programs de-professionalized their work.¹⁹⁸ As the Kenyan government rolled out its new curriculum in 2019, it chose to reduce the number of lessons for English and Kiswahili, which had the effect of reducing the instructional time available for an effective structured pedagogy program. Sometimes the resistance comes from unions, sometimes it comes from curriculum bodies, and sometimes from the core ministry. In some cases, the resistance is related to concerns that structured pedagogy programs are developed in the West and forced on LMICs without consideration of these contexts and the potential for cultural imperialist tendencies. Responding to these critiques is a task essential to ensuring structured pedagogy impacts, and sometimes understanding the valid concerns of these stakeholders can substantially improve the quality of the program. **In short, what do we know? Structured pedagogy programs have been resisted in many contexts for a variety of reasons. To be effective, some structured pedagogy programs can improve by responding to the valid concerns of stakeholders and by revising the program structure accordingly, while others may have to advocate for program components that are deemed essential.**

D. What We Don't Know About Structured Programs in LMICs

This section presents what we do not yet know about structured pedagogy programs in LMICs.

1) Should Structured Pedagogy Programs Be a Short-Term Scaffold or a Long-Term Support System?

Mourshed, Chijioke, and Barber¹⁹⁹ suggested that structured pedagogy programs are appropriate to raise instructional outcomes from poor to fair, based on the idea that having tight control of teaching and learning is essential to improve performance at these levels. We believe that there will continue to be a need for ongoing alignment among learning materials, teacher training, and support, but it remains to be seen how long teachers will benefit from the current teacher's guide. It takes substantial time and effort for teachers to learn and become proficient in the new pedagogical skills and pedagogical content knowledge required to effectively implement structured pedagogy programs. It may be that teachers need to continue to support teachers as they move through the change process. Given the statistically significant and substantively meaningful impacts of structured pedagogy programs across many LMICs, it is worth examining more deeply whether the teacher's guides and lesson plans should only be provided as a short-term scaffold for struggling education systems and for particularly complex skills, or, whether the combined structured pedagogy program should be a long-term support system for countries needing to focus on improving learning. A way to continue to provide structured pedagogy as teacher skills increase is to adjust the level of autonomy they have in the teacher guide. (see Figure 6). The evidence on what happens in the years after five years of a relatively nascent intervention is relatively limited. We have typically seen program effects plateau at a certain level, and in that case, it might not be logical to continue to invest in interventions whose impacts will level out. Many countries in sub-Saharan Africa are moving toward skills- or competency-based curricula, which have a much higher expectation of how much knowledge will be created by the learner and therefore might have a more difficult time implementing structured pedagogy programs, depending on the countries' understanding and implementation of these programs.²⁰⁰ On the other hand, one could make the case that the magnitude of the effects on learning from structured pedagogy suggest that they should be expanded and continued. Beginning teachers and those who are tasked with teaching a subject for which they have no pedagogical content knowledge will continue to value



structured pedagogy programs, for example. And their voices should always be included by those who are designing and considering adjustments. An ideal method to determine whether structured pedagogy programs might no longer be required would be to dramatically improve the quality of pre-service training so that teachers are better equipped with pedagogical skills and the ability to respond to formative assessment to redesign their pedagogical techniques and pacing.

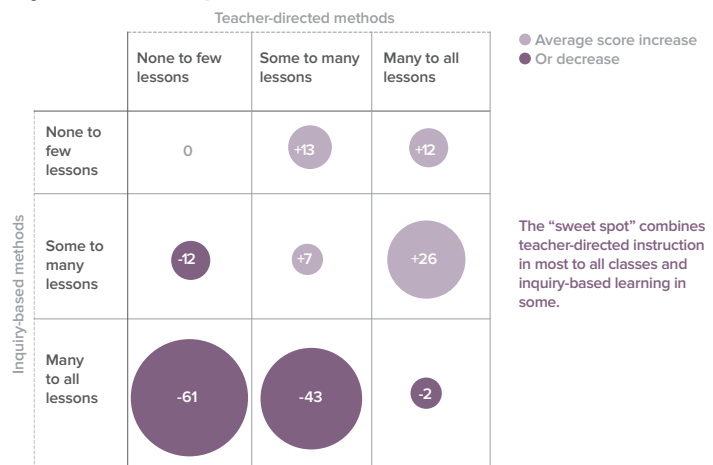
2) Can Structured Pedagogy Programs Be as Effective Beyond Lower Primary?

The vast majority of structured pedagogy programs that this guide addresses are in lower primary or preprimary education. There has simply been less done to examine whether structured pedagogy programs could work in upper primary, which we mentioned above.²⁰¹ Some of the existing lower primary programs have spilled over into grade 4 as a transition year, with mixed results in Uganda and Philippines.

Although we described above some structured pedagogy programs in upper primary and secondary interventions, the evidence remains limited as to whether structured pedagogy programs can be as effective in upper primary and secondary levels. These programs provide important technical supports to teachers who lack the skills needed to design carefully organized instructional programs on their own. The investment required to develop structured pedagogy programs across the subject areas might be substantial and raise questions of sustainability, though this viewpoint depends on an understanding of whether not investments on structured pedagogy need to remain substantial or whether the costs of the work and funding required to set up coaching and support systems would decline over time. With content-focused instructional programs, a structured pedagogy program might be less appropriate. Some would argue that a focus on content might be foolhardy, and instead, upper primary should look at the skills teachers need.

The question about the place of structured pedagogy remains outstanding in secondary school in LMICs as well, and although the United Kingdom Department for International Development-funded Sierra Leone Leh Wi Lan program²⁰² has suggested that structured pedagogy can work in literacy, numeracy, and science in secondary school, it is unclear how transferable these experiences might be within the varied contexts in this region. On the other hand, given that upper primary and secondary typically have far less language complexity, based on government language-of-instruction policies, it might be simpler to develop these learning materials than those in lower primary. Mourshed, Krawitz, and Dorn used PISA secondary school science results (see Figure 11) to suggest that a combination of teacher-directed methods in “many to all” lessons with inquiry-based methods for “some to many” lessons was associated with the highest gains in average scores on PISA.²⁰³ This study did not make causal claims, however, and without clearer rigorous evidence, the relationship between secondary outcomes and structured pedagogy programs remains to be seen. Their findings call into question the assumption that inquiry-based instruction is necessarily more effective, because its impact depends largely on the skill levels of teachers using those methods.

FIGURE 11. Teacher-directed and inquiry-based methods and impacts on learning outcomes²⁰¹



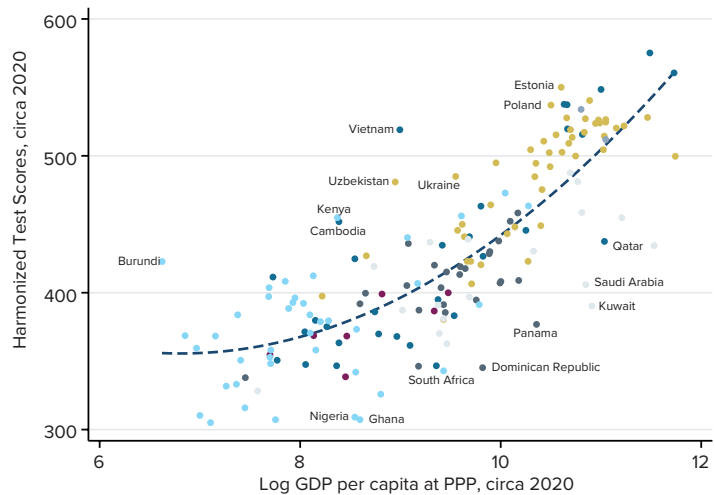
3) What Are the Long-Term Human Capital Impacts of Structured Pedagogy Programs?

The World Bank recently updated its human capital index.²⁰⁵ Figure 12 presents the relationship between gross domestic product (GDP) per capita and harmonized test scores and reminds us of the human capital improvements required in sub-Saharan Africa, because the majority of sub-Saharan Africa countries have substantially lower learning outcomes than the rest of the countries with data. This analysis was not able to determine the causal direction—namely, whether the gains in human capital would cause increases in GDP per capita, or vice versa. The assumption underpinning the education part of this work is not controversial; the field has accepted as a given that increased learning outcomes will result in human capital creation, which will have a close relationship with increased economic productivity in LMICs.²⁰⁶ This assumption is based on several key assumptions. First, the additional skills that structured pedagogy programs afford will be what the higher levels of education accept as key and important through the primary and secondary examination barriers. Second, the gains achieved by young



learners benefiting from structured pedagogy programs will persist throughout their education lifespan. Third, the relationship between education outcomes and economic productivity is robust to many of the recent criticisms. Note that these questions are not specific to structured pedagogy, but to the entire subsector of primary education. The relationship between these scores and GDP is not as predictive as Figure 12, and there are more sub-Saharan Africa outliers, such as Kenya and Burundi, whose test scores are higher than their GDP would predict, while Nigeria and Ghana and South Africa underperform. Might it be possible to improve these scores through structured pedagogy interventions and have a resultant impact on GDP, and if so, what is the lag time between those improvements? These are open questions for future research.

FIGURE 12. GDP and learning outcomes²⁰⁴



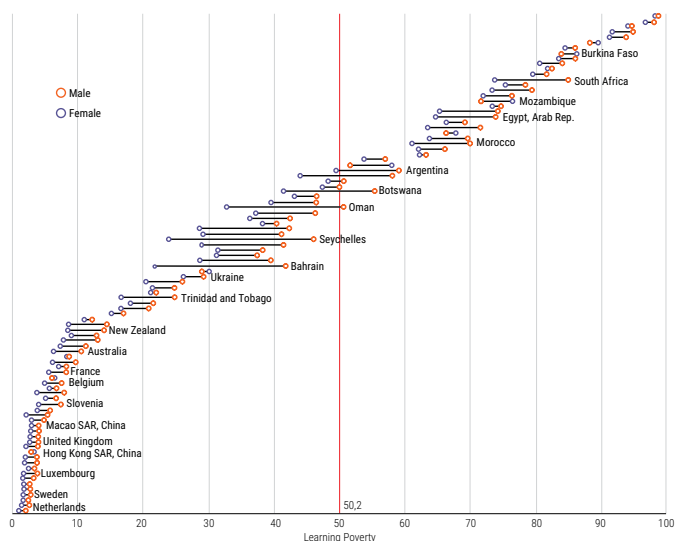
4) How Do Lighter Touch Structured Pedagogy Programs Ultimately Compare with Deeper Investments?

We have seen that some interventions funded by the World Bank and the Global Partnership for Education have had substantially smaller impacts on learning.²⁰⁸ Per child, however, those interventions sometimes have a lower cost (though not always, given the wastefulness of some multilateral program interventions). A key assumption to the cost-effectiveness assessments of the GEEAP is that one needs to have an impact in order to have any cost-effectiveness.²⁰⁹ What remains to be learned is what the minimum per child investment is that will result in long-term sustainable impacts on learning. We assume that it is possible to improve the quality of the multilateral and even government-only structured pedagogy interventions in LMICs, but more research is necessary to determine how best to ensure impacts of structured pedagogy while reducing cost per child. Our final comment on this point is that it is not worth doing any reform more cheaply if cost is the only determinant, because there is a long history of cheap but entirely ineffectual education reforms.

5) Do Structured Program Impacts Differ by Gender?

The World Bank's learning poverty report estimated whether countries' learning outcomes differed by gender.²¹⁰ For some countries in sub-Saharan Africa in particular, learning outcomes were typically higher for boys than girls, although there was variation in the gender and learning outcomes comparisons in the region. The learning poverty measures from World Bank (2019) showed small but meaningful higher learning poverty estimates for girls than boys, particularly for some countries in sub-Saharan Africa on the right part of the graph in Figure 13. Structured pedagogy programs can have substantial impacts on learning outcomes for girls. In fact, Evans and Yuan found that the structured pedagogy programs that were not specifically targeted at girls had a larger impact on girls' learning outcomes than programs that focused on helping girls in particular.²¹¹ This result suggests that good instruction helps girls. We found consistently better outcomes for girls, particularly in lower primary literacy, in structured pedagogy programs designed for all students. The evidence is less clear as to whether the impacts of structured pedagogy programs differ by the gender of teachers, coaches, or government officers. Initial cross-sectional noncausal evidence seems to indicate that outcomes are somewhat better for students taught by a woman, but more research will be necessary to determine whether these differences are general for female teachers or specific to structured pedagogy programs.

FIGURE 13. Learning outcomes by gender²⁰⁹



6) How Should Effective Literacy and Numeracy Programs Work Together?

There is significant evidence about the design and effectiveness of early grade literacy programs. The evidence for early grade numeracy programs is developing, with some initial evidence of impact at scale.²¹³ Our knowledge of how literacy and numeracy structured pedagogy programs can interact most effectively is nascent. More evidence, particularly at large scale, is needed both on the design of numeracy programs and on the ways in which they complement literacy programs, and vice versa.²¹⁴ However, there are lessons learned from a few programs that have targeted literacy and numeracy at the same time. Some programs have effectively used storybooks with embedded numeracy concepts (FHI360 in Nigeria and Save the Children in Bangladesh), or promoted common instructional strategies such as “extending conversations in numeracy and literacy” in Kenya’s Tayari program.²¹⁵ In general, a review of the evidence recommends that whereas literacy and numeracy are taught as two distinct subjects, given the different ways in which the content is organized and differences in instructional practices, efforts to make underlying linkages explicit to teachers are key to ensure a comprehensive approach.²¹⁶ For example, strong language skills are needed not just for oral comprehension, but also for communication and discussion of mathematical ideas. It is especially important given that many teachers in primary school teach both numeracy and literacy and that any cost-effective literacy and numeracy program integration would depend on training and supporting teachers in an integrated fashion (see Guide 6, on teacher support).

7) How much do effective structured pedagogy programs cost?

Although structured pedagogy interventions have expanded in many LMICs, knowledge remains limited as to how much these programs cost and whether there is a threshold of cost required to ensure effectiveness. The “Smart Buys” work characterized the effectiveness of structured pedagogy programs by their cost and showed that some of these programs were as cost-effective as any other program in the sector,²¹⁷ averaging more than three learning adjusted years per schooling per US\$100 investment. Data collected during the PRIMR intervention provided details on costs and allowed for a cost-effectiveness analysis.²¹⁸ More evidence-gathering is under way in this area, and the Learning at Scale research will be able to describe the costs and cost-effectiveness of structured pedagogy interventions by early 2021. This is critical information to share with policy makers as they determine how scarce resources should best be invested.

E. Conclusion

This literature review has focused on what we know and what we do not know about structured pedagogy programs in low- and middle-income countries. The structured pedagogy how-to guides address particular tasks within the structured pedagogy framework that would help us understand how to implement particular tasks within the structured pedagogy framework. We encourage readers to review the other titles in this series to consider how to effectively implement large-scale foundational literacy and numeracy programs in low- and middle-income countries. The guides to structured pedagogy that accompany this literature review are:

GUIDE 1: [Government Leadership and Teacher Adoption](#)



Effective foundational literacy and numeracy programs need government leadership. This requires listening to government priorities, amplifying the ideas of champions, and using country-specific evidence. Succeeding in these programs requires understanding teacher decision-making and ensuring civil servants’ job descriptions and incentives align with program priorities.

GUIDE 2: [Designing an Effective Structured Pedagogy Program](#)



Program impact depends on key program design decisions. More effective programs do more by doing less and simplifying the task of improving teacher pedagogy, and they have programs that are designed to be scaled up and use evidence of rigorous pilot studies to implement the most effective interventions.

GUIDE 3: [Curriculum and Scope and Sequence Development for Literacy and Numeracy](#)



Learn about the expected skills of students, what teachers do well, and expectations for a curriculum adjustment. Decide skills and pacing that aligns with the science through collaboration with the government. Develop a living scope and sequence.



GUIDE 4: [Teaching and Learning Materials Development](#)



Ensure that any student materials are engaging, simple, and appropriate to the target grade level. Teacher materials should be closely aligned with student materials, provide scaffolding appropriate to teacher experiences, and have everything needed for a lesson clearly laid out in one place. Do not underestimate the amount of time necessary to develop high quality materials.

GUIDE 5: [Teacher Professional Development: Teacher training](#)



Design training programs based on adult learning principles focusing on practical experiences with the content that is immediately relevant to build self-efficacy before teachers enter the classrooms. Plan logistics of larger trainings as far in advance as possible ensuring support to all levels of a training cascade.

GUIDE 6: [Teacher Professional Development: Ongoing Teacher Support](#)



Develop and implement a system to ensure that teachers receive ongoing support after they have participated in training. Include multiple touch-points for teachers and ensure that coaches and communities of practice receive enough training and support to help teachers succeed.

GUIDE 7: [Data, Systems, and Accountability](#)



Work with government to embed data systems that promote accessible, rapid feedback on each program component, taking limited resources and varying priorities into account. Communicate findings in a timely manner to ensure accountability, adaptation and a demand for further data and future use.

GUIDE 8: [What Education Leaders Need to Know](#)



Set and communicate student level outcomes in ways that all stakeholders can understand. Hold the system accountable for providing schools, teachers and students the supports they need to achieve those outcomes.

RESOURCES

Structured pedagogy program report commissioned by USAID: Available at www.edu-links.org.

Structured pedagogy report commissioned by UNICEF: *Structured pedagogy: For real-time equitable improvements in learning outcomes*, v. 02. See endnote 1. <https://www.unicef.org/esa/documents/structured-pedagogy>.

Evidence report on what works in Africa: <https://www.cgdev.org/sites/default/files/education-africa-what-are-we-learning.pdf>. See endnote 73.

World Bank learning poverty report: <https://openknowledge.worldbank.org/handle/10986/32553>. See endnote 6.

Brief on improving girls' learning: <https://www.cgdev.org/sites/default/files/evans-yuan-girls-education-factsheet.pdf>

Developing teacher's guides for structured pedagogy programs: <https://doi.org/10.3768/rtipress.2018.op.0053.1805>. See endnote 115.

REFERENCES

- Chakera, S., Haffner, D., & Harrop, E. (2020). *Structured pedagogy: For real-time equitable improvements in learning outcomes*, v. 02. (United Nations Children's Fund [UNICEF] Eastern and Southern Africa working paper). Nairobi, Kenya: UNICEF. <https://www.unicef.org/esa/documents/structured-pedagogy>.
- Crouch, L., Olefir, A., Saeki, H., & Savrimootoo, T. (2020). Déjà vu all over again? Recent evidence on early childhood and early grade repetition in developing countries. *Prospects*. <https://doi.org/10.1007/s11125-020-09473-2>
- World Bank. (2018a). *World Development Report: Learning to realize education's promise*. Washington, DC: World Bank. <https://www.worldbank.org/en/publication/wdr2018>
- Pritchett, L. (2019). There is a learning crisis at the top, too: New results from PISA-D [Blog post]. https://riseprogramme.org/blog/learning_crisis_at_top
- World Bank, 2018a; see endnote 3.
- World Bank. (2019). *Ending learning poverty: What will it take?* Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/32553>
- World Bank. (2005). *Education in Ethiopia: Strengthening the foundation for sustainable progress*. World Bank Country Study. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/7434>
- Lockheed, M. E., & Verspoor, A. M. (1991). *Improving primary education in developing countries* (English). Washington, DC: World Bank Group. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/279761468766168100/Improving-primary-education-in-developing-countries>



- 9 Muralidharan, K., & Singh, A. (2019). *Improving schooling productivity through computer-aided instruction: Experimental evidence from Rajasthan*. Presentation at RISE annual conference; streamed live on June 20, 2019. <https://www.youtube.com/watch?v=IN3LSRU3xA&feature=youtu.be&t=4005>
- 10 Piper, B., Schroeder, L., & Trudell, B. (2016). Oral reading fluency and comprehension in Kenya: Reading acquisition in a multilingual environment. *Journal of Research in Reading*, 39(2), 133-152. <https://doi.org/10.1111/1467-9817.12052>
- 11 Pritchett, L. (2013). *The rebirth of education: Schooling ain't learning*. Washington, DC: Center for Global Development.
- 12 Kim, Y.-S. G., & Davidson, M. (2019). *Promoting successful literacy acquisition through structured pedagogy: Global Reading Network Critical Topics Series*. Prepared by University Research Co., LLC. (URC) under the Reading within Reach (REACH) initiative for USAID's Building Evidence and Supporting Innovation to Improve Primary Grade Assistance for the Office of Education (E3/ED). https://www.globalreadingnetwork.net/sites/default/files/media/file/Structured%20Pedagogy_REACH%20Nov%202019.pdf
- 13 Shuh-Moore, A.-M., DeStefano, J., & Adelman, E. (2011). Time misspent, opportunities lost: Use of time in school and learning. In J. Hawkins (Ed.), *Policy debates in comparative, international, and development education* (pp. 247-264). New York, NY: Palgrave Macmillan.
- 14 World Bank. (2013). *What matters most for teacher policies: A framework paper*. SABER [Systems Approach for Better Education Results] Working Paper Series No. 4. Washington, DC: World Bank. http://wbfiles.worldbank.org/documents/hdn/ed/saber/supporting_doc/Background/TCH/Framework_SABER-Teachers.pdf
- 15 Commeyras & Inyega, 2007. See endnote 15.
- 16 Commeyras, M., & Inyega, H. N. (2007). An integrative review of teaching and reading in Kenya primary schools. *Reading Research Quarterly*, 42(2), 258-281. <https://doi.org/10.1598/RRQ.42.2.3>
- 17 Cuban, L. (2017). *How teachers taught: Constancy and change in American classrooms, 1890-1990*. New York: Teachers College Press. <https://www.tcpress.com/how-teachers-taught-9780807776391>
- 18 Muralidharan, M., & Niehaus, P. (2017). Experimentation at scale. *The Journal of Economic Perspectives*, 31(4), 103-124. <https://doi.org/10.1257/jep.31.4.103>
- 19 Wagaw, T. G. (1979). *Education in Ethiopia: Prospect and retrospect*. Ann Arbor: University of Michigan Press.
- 20 Bauml, M. (2015). Beginning primary teachers' experiences with curriculum guides and pacing calendars for math and science instruction. *Journal of Research in Childhood Education*, 29(3), 390-409. <https://doi.org/10.1080/02568543.2015.1040565>
- 21 Beatty, B. (2011). The dilemma of scripted instruction: Comparing teacher autonomy, fidelity, and resistance in the Froebelian kindergarten, Montessori, direct instruction, and Success for All. *Teachers College Record*, 113(3), 395-430.
- 22 Bauml, 2015; see endnote 20.
- 23 Glatthorn, Allan A. (2018). Curriculum history: The perspective of the past. Chapter 2 in Allan A. Glatthorn, Floyd Boschee, Bruce M. Whitehead, & Bonni F. Boschee (Eds.), *Curriculum leadership: Strategies for development and implementation* (5th ed., pp. 35-66). Los Angeles: SAGE.
- 24 Bohning, G. (1986). The McGuffey eclectic readers: 1836-1986. *The Reading Teacher*, 40(3), 263-269.
- 25 Neem, J. N. (2018). The strange afterlife of William McGuffey and his readers. *The Hedgehog Review*, 20(2), 114-123.
- 26 Winship, A. E. (1896). *Horace Mann, the educator*. Boston, MA: New England Publishing Company.
- 27 Dewey, J. (1906). *The child and the curriculum* (No. 5). Chicago, IL: University of Chicago Press.
- 28 Beatty, 2011; see endnote 21.
- 29 Woodward, A. (1986). Taking teaching out of teaching and reading out of learning to read: A historical study of reading textbook teachers' guides, 1920-1980. *Book Research Quarterly*, 2(1), 53-77. <https://doi.org/10.1007/BF02683601>
- 30 Fogarty, J. S. (1976). The Tyler rationale: Support and criticism. *Educational Technology*, 16(3), 28-32.
- 31 Woodward, 1986; see endnote 29.
- 32 Beatty, 2011; see endnote 21.
- 33 Fitzgerald, J., Elmore, J., Relyea, J. E., Hiebert, E. H., & Stenner, A. J. (2016). Has first-grade core reading program text complexity changed across six decades? *Reading Research Quarterly*, 51(1), 7-28.
- 34 Woodward, 1986; see endnote 29.
- 35 Beatty, 2011; see endnote 21.
- 36 No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1425 (2002). <https://www2.ed.gov/policy/elsec/leg/esea02/107-110.pdf>
- 37 National Institute of Child Health and Human Development (NICHD) [United States]. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. Reports of the subgroups*. U.S. National Institutes of Health Publication No. 00-4754. Washington, DC: U.S. Government Printing Office. <https://www.nichd.nih.gov/publications/pubs/hrp/documents/report.pdf>
- 38 Lenski, S., Larson, M., McElhone, D., Davis, D. S., Lauritzen, C., Villagómez, A., Yeigh, M., Landon-Hays, M., Lejeune, M., & Scales, W. D. (2016). What teachers want: A statewide survey of reading and English language arts teachers' instructional materials, preferences, and practices. *Literacy Research and Instruction*, 55(3), 237-261. <https://doi.org/10.1080/19388071.2016.1156202>
- 39 Rose, J. (2006). *Independent review of the teaching of early reading final report*. UK Department for Education and Skills. <https://dera.ioe.ac.uk/5551/2/report.pdf>
- 40 Rowe, K. (2005). *Teaching reading: National inquiry into the teaching of literacy*. Department of Education, Science and Training, Australian Council for Educational Research. https://research.acer.edu.au/til_misc/5/
- 41 Mourshed, M., Chijioko, C., & Barber, M. (2010). *How the world's most improved school systems keep getting better*. McKinsey & Company. https://www.mckinsey.com/~media/mckinsey/industries/public%20and%20social%20sector/our%20insights/how%20the%20worlds%20most%20improved%20school%20systems%20keep%20getting%20better/how_the_worlds_most_improved_school_systems_keep_getting_better.pdf
- 42 Institute of Education Sciences (IEE), National Center for Education Evaluation and Regional Assistance, [O]U.S. Department of Education. (2020). *What Works Clearinghouse*. Retrieved September 28, 2020, from <https://ies.ed.gov/ncee/wwc/>



- 43 Nebraska Department of Education, Nebraska ESU Coordinating Council, & Nebraska State Literacy Association. (2020). *Nebraska Instructional Materials Collaborative*. Retrieved September 28, 2020, from <https://nematerialsmatter.org/>
- 44 Marshall Cavendish Education. (2013). *New pathways to success: The history of Singapore math* [2-page brief]. New York: Houghton Mifflin Harcourt. https://www.hmhc.com/~media/sites/home/education/global/pdf/white-papers/mathematics/elementary/math-in-focus/mif_2013_history_flyer_lr.pdf
- 45 World Bank. (2018b). *Growing smarter: Learning and equitable development in East Asia and Pacific*. Washington, DC: World Bank.
- 46 Xiaoyan, L., Kidwai, H., & Zhang, M. (2016). *How Shanghai does it: insights and lessons from the highest-ranking education system in the world*. Directions in Development. Washington, DC: World Bank. <https://doi.org/10.1596/978-1-4648-0790-9>
- 47 Kazmi, A. (2019). *Teaching and learning mathematics in Karachi's low-cost private schools*. [Unpublished doctoral dissertation] University College London.
- 48 Kim & Davidson, 2019; see endnote 12.
- 49 Kim & Davidson, 2019, see endnote 12.
- 50 Kim & Davidson, 2019, p. 2; see endnote 12.
- 51 Kim & Davidson, 2019, see endnote 12.
- 52 Kim & Davidson, 2019, see endnote 12.
- 53 Beatty, 2011; see endnote 21.
- 54 Hodge, E., & Benko, S. L. (2014). A 'common' vision of instruction- An analysis of English/language arts professional development materials related to the Common Core State Standards. *English Teaching*, 13(1), 169-196.
- 55 Petrie, K. (2012). Enabling or limiting: The role of pre-packaged curriculum resources in shaping teacher learning. *Asia-Pacific Journal of Health, Sport and Physical Education*, 3(1), 17-34. <https://doi.org/10.1080/18377122.2012.666196>
- 56 Brenner, D., & Hiebert, E. H. (2010). If I follow the teachers' editions, isn't that enough- Analyzing reading volume in six core reading programs. *The Elementary School Journal*, 110(3), 347-363. <https://doi.org/10.1086/648982>
- 57 Woodward, 1986; see endnote 29.
- 58 Freire, P. (1974). *Pedagogy of the oppressed*. New York: Seabury Press.
- 59 Bauml, 2015; see endnote 20.
- 60 Crawford, P. A. (2004). I follow the blue...- A primary teacher and the impact of packaged curricula. *Early Childhood Education Journal*, 32(3), 205-210. <https://doi.org/10.1023/B:ECEJ.0000048974.70769.35>
- 61 Piasta, S. B., Connor, C. M., Fishman, B. J., & Morrison, F. J. (2009). Teachers' knowledge of literacy concepts, classroom practices, and student reading growth. *Scientific Studies of Reading*, 13(3), 224-248. <https://doi.org/10.1080/10888430902851364>
- 62 Silberberg, H., Kärki, T., & Hannula, M. S. (Eds.). (2015). *Nordic research in mathematics education: Proceedings of NORMA14*, Turku, June 3-6, 2014. Turku, Finland: University of Turku, Department of Teacher Education.
- 63 Dewitz, P., & Jones, J. (2013). Using basal readers: From dutiful fidelity to intelligent decision making. *The Reading Teacher*, 66(5), 391-400. <https://doi.org/10.1002/TRTR.01134>
- 64 Reisboard, D., & Jay, A. B. (2013). Teachers' perceptions: Transitioning from teacher-selected reading materials to implementing a core reading program. *The Journal of Balanced Literacy Research and Instruction*, 1(2), 24-39. <http://digitalcommons.lsu.edu/jblri/vol1/iss2>
- 65 Banerjee, A., Glewwe, P., Powers, S., & Wasserman, M. (2013). *Expanding access and increasing student learning in post-primary education in developing countries: A review of the evidence*. Post-Primary Education Initiative Review Paper, Abdul Latif Jameel Poverty Action Lab, Cambridge, MA.
- 66 Conn, K. (2014). *Identifying effective education interventions in sub-Saharan Africa: A meta-analysis of rigorous impact evaluations*. Unpublished manuscript. Columbia University, New York, NY.
- 67 Evans, D. & Popova, A. (2015). *What really works to improve learning in developing countries? An analysis of divergent findings in systematic reviews*. Policy Research Paper 7203. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/29308>
- 68 Glewwe, P. W., Hanushek, E. A., Humpage, S. D., & Ravina, R. (2014). School resources and educational outcomes in developing countries: A review of the literature from 1990 to 2010. In P. Glewwe (Ed.), *Education policy in developing countries* (pp. 13-64). Chicago: University of Chicago Press. <https://doi.org/10.3386/w17554>
- 69 Graham, J., & Kelly, S. (2018). *How effective are early grade reading interventions? A review of the evidence*. Washington, DC: World Bank. <https://doi.org/10.1596/1813-9450-8292>
- 70 Krishnaratne, S., White, H., & Carpenter, E. (2013). *Quality education for all children- What works in education in developing countries*. 3ie Working Paper 20 [International Initiative for Impact Evaluation]. <https://www.3ieimpact.org/evidence-hub/publications/working-papers/quality-education-all-children-what-works-education>
- 71 McEwan, P. (2012). Improving learning in primary schools of developing countries: A meta-analysis of randomized experiments. *Review of Educational Research*, 20(10), 1-42.
- 72 Murnane, R. J., & Ganimian, A. J. (2014). *Improving educational outcomes in developing countries: Lessons from rigorous evaluations*. NBER Working Paper No. 20284. Cambridge, MA: National Bureau of Economic Research. <https://www.nber.org/papers/w20284.pdf>
- 73 Evans, D. K., & Mendez Acosta, A. (2020). *Education in Africa: What are we learning?* Working Paper No. 542. Washington, DC: Center for Global Development. <https://www.cgdev.org/sites/default/files/education-africa-what-are-we-learning.pdf>
- 74 Evans & Mendez Acosta, 2020; see endnote 73.
- 75 Global Education Evidence Advisory Panel (GEEAP). (2020). *Cost-effective approaches to improve global learning levels*. Manuscript submitted for publication.
- 76 The Cohen's *d* effect size, used across the social sciences-including in education-set benchmarks so that program impacts of 0.20 standard deviations (SD) were considered small, 0.50 moderate, and 0.80 large. Kraft (2020) argued that these effect size breakdowns were inappropriate for the education sector and instead noted that 0.20 SD effects were large. Kraft's (2020) work has influenced a sea change in how education intervention impacts are interpreted, but Evans and Yuan (2020) recently updated these analyses for sub-Saharan African contexts. They argued that effect sizes of 0.38 SD are considered very large, at the 90th percentile or higher, of the 130 evaluations that they reviewed that focused on improving learning. Stern and Piper (2019) examined the magnitude of structured pedagogy impacts in LMICs and the United States to determine whether the impacts that were experienced in the United States were relevant for the LMIC context, particularly in sub-Saharan Africa. They found that the average effect



- size of structured pedagogy programs was 0.44 SD, twice as high as the impacts in the United States. Using Kraft's (2020) comparison method, U.S. gains were considered substantial, but the impacts of structured pedagogy programs with evidence as of 2019 were twice as high. More than that, using Evans and Yuan's (2020) typology of program impacts on learning, structured pedagogy interventions are, on average, above the 90th percentile, though with an obvious range of impacts available. A criticism of effect size comparisons is warranted, as Hattie's (2008) use of effect sizes in the U.S. literature has many valid critiques (McKnight & Whitburn, 2020; Rømer, 2019), and we would not suggest that the magnitude of effect sizes be the only means to determine whether structured pedagogy programs are worth investment in LMICs. See subsequent endnotes for full citations.
- 77 Kraft, M. A. (2020). Interpreting effect sizes of education interventions. *Educational Researcher*, 9(4), 241-253. <https://doi.org/10.3102/0013189X20912798>
- 78 Evans, D. K., & Yuan, F. (2020). *How big are effect sizes in international education studies?* Working Paper No. 545. Washington, DC: Center for Global Development. <https://www.cgdev.org/publication/how-big-are-effect-sizes-international-education-studies>
- 79 Stern, J. M. B., & Piper, B. (2019). *Resetting targets: Why large effect sizes in education development programs are not resulting in more students reading at benchmark*. RTI Press Publication No. OP-0060-1904. Research Triangle Park, NC: RTI Press. <https://doi.org/10.3768/rtipress.2019.op.0060.1904>
- 80 Hattie, J. (2008). *Visible Learning: A synthesis of over 800 meta-analyses relating to achievement*. London: Routledge. <https://doi.org/10.4324/9780203887332>
- 81 McKnight, L., & Whitburn, B. (2020). Seven reasons to question the hegemony of Visible Learning. *Discourse* (Abingdon), 41(1), 32-44. <https://doi.org/10.1080/01596306.2018.1480474>
- 82 Rømer, T. A. (2019). A critique of John Hattie's theory of Visible Learning. *Educational Philosophy and Theory*, 51(6), 587-598. <https://doi.org/10.1080/00131857.2018.1488216>
- 83 Gove, A., Korda Poole, M., & Piper, B. (2017). Designing for scale: Reflections on rolling out reading improvement in Kenya and Liberia. *New Directions for Child and Adolescent Development*, 155(2017), 77-95. <https://doi.org/10.1002/cad.20195>
- 84 Data source 1: Evans & Yuan, 2020; see endnote 78.
- 85 Data source 2: Graham & Kelly, 2018; see endnote 69.
- 86 Data source 3: Stern & Piper, 2019; see endnote 79.
- 87 GEEAP, 2020; see endnote 75.
- 88 GEEAP, 2020; see endnote 75.
- 89 Banerjee et al., 2013; see endnote 65.
- 90 Conn, 2014; see endnote 66.
- 91 Evans & Mendez Acosta, 2020; see endnote 73.
- 92 Evans & Popova, 2015; see endnote 67.
- 93 Glewwe et al., 2014; see endnote 68.
- 94 Graham & Kelly, 2018; see endnote 69.
- 95 Krishnaratne et al., 2013; see endnote 70.
- 96 McEwan, 2012; see endnote 71.
- 97 Murnane & Ganimian, 2014; see endnote 72.
- 98 Banerjee, A., Banerji, R., Berry, J., Duflo, E., Kannan, H., Shobhini, M., Shotland, M., & Walton, M. (2016). *Mainstreaming an effective intervention: Evidence from randomized evaluations of Teaching at the Right Level in India*. NBER Working Paper #22746, October 2016.
- 99 Dubeck, M. M., Piper, B., Jukes, M. C. H., & Stern, J. (2019, April 10). *Learning at Scale: Call for programs*. Center for Global Development. <https://www.cgdev.org/blog/learning-at-scale-call-for-programs>
- 100 Stern & Piper, 2019; see endnote 79.
- 101 Mourshed, Chijioke, & Barber, 2010; see endnote 41.
- 102 Borman, G. D., Slavin, R. E., Cheung, A. C. K., Chamberlain, A. M., Madden, N. A., & Chambers, B. (2007). The national randomized field trial of Success for All: Second-year outcomes. *American Educational Research Journal*, 42(4), 673-696. <https://doi.org/10.3102/00028312042004673>
- 103 Evans & Mendez Acosta, 2020; see endnote 73.
- 104 Stannard, J., & Huxford, L. (2007). *The literacy game: The story of the national literacy strategy*. New York: Routledge. <https://doi.org/10.4324/9780203944912>
- 105 Banerjee, Glewwe et al., 2013; see endnote 65.
- 106 Conn, 2014; see endnote 66.
- 107 Evans & Mendez Acosta, 2020; see endnote 73.
- 108 Evans & Popova, 2015; see endnote 67.
- 109 Glewwe et al., 2014; see endnote 68.
- 110 Graham & Kelly, 2018; see endnote 69.
- 111 Krishnaratne et al., 2013; see endnote 70.
- 112 McEwan, 2012; see endnote 71.
- 113 Murnane & Ganimian, 2014; see endnote 72.
- 114 Meltzoff, A. N., Kuhl, P. K., Movellan, J., & Sejnowski, T. J. (2009). Foundations for a new science of learning. *Science*, 325(5938), 284-288. <https://doi.org/10.1126/science.1175626>
- 115 Deans for Impact. (2015). *The science of learning*. Austin, TX: Deans for Impact. https://deansforimpact.org/wp-content/uploads/2016/12/The_Science_of_Learning.pdf
- 116 Horvath, J. C., Lodge, J. M., & Hattie, J. (Eds.) (2017). *From the laboratory to the classroom: Translating science of learning for teachers*. London: Routledge. <https://doi.org/10.4324/9781315625737>
- 117 Riep, C. (2019). *What do we really know about Bridge International Academies? A summary of research findings*. Brussels, Belgium: Education International. https://issuu.com/educationinternational/docs/2019_ei_research_gr_bia
- 118 Piper, B., Sitabkhan, Y., Mejia, J., & Betts, K. (2018). *Effectiveness of teachers' guides in the Global South: Scripting, learning outcomes, and classroom utilization*. RTI Press Publication No. OP-0053-1805. Research Triangle Park, NC: RTI Press. <https://doi.org/10.3768/rtipress.2018.op.0053.1805>
- 119 Mattos, M., & Sitabkhan, Y. (2016). *Malawi Early Grade Reading Activity: Scripting study report*. Prepared for USAID under Contract No. AID-612-C-13-00002. Research Triangle Park, NC: RTI International. https://pdf.usaid.gov/pdf_docs/pa00mdzf.pdf
- 120 Piper, Sitabkhan, Mejia, & Betts, 2018; see endnote 115.
- 121 Piper, Sitabkhan, Mejia, & Betts, 2018; see endnote 115.
- 122 Piper, Sitabkhan, Mejia, & Betts, 2018; see endnote 115.
- 123 Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1-22.
- 124 Dubeck, M. M., Jukes, M. C., Brooker, S. J., Drake, T. L., & Inyega, H. N. (2015). Designing a program of teacher professional development to support beginning reading acquisition in coastal Kenya. *International Journal of Educational Development*, 41, 88-96. <https://doi.org/10.1016/j.ijedudev.2014.11.022>



- 125 Piper, B., Ralaingita, W., Akach, L., & King, S. (2016). Improving procedural and conceptual mathematics outcomes: Evidence from a randomised controlled trial in Kenya. *Journal of Development Effectiveness*, 8(3), 404-422. <https://doi.org/10.1080/19439342.2016.1149502>
- 126 Lenski et al., 2016; see endnote 38.
- 127 Silfverberg et al., 2015; see endnote 62.
- 128 Commeyras, M. (2007). Scripted reading instruction- What's a teacher educator to do? *Phi Delta Kappan*, 88(5), 404-407. <https://doi.org/10.1177/003172170708800515>
- 129 Petrie, 2012; see endnote 55.
- 130 Davis, E. A., & Krajcik, J. S. (2005). Designing educative curriculum materials to promote teacher learning. *Educational Researcher*, 34(3), 3-14. <https://doi.org/10.3102/0013189X034003003>
- 131 Ranjha, F. A., Mahmood, M. K., & Butt, I. H. (2019). Use and utility of teacher guides for primary school teachers in Punjab. *Review of Economics and Development Studies*, 5(1), 5-10. <https://doi.org/10.26710/reads.v5i1.518>
- 132 Feldon, D. F. (2007). Cognitive load and classroom teaching: The double-edged sword of automaticity. *Educational Psychologist*, 42(3), 123-137. <https://doi.org/10.1080/00461520701416173>
- 133 Fuller, B. (1986). *Raising school quality in developing countries: What investments boost learning?* Washington, DC: World Bank.
- 134 World Bank, 2019; see endnote 6.
- 135 Piper, B., DeStefano, J., Kinyanjui, E., & Ong'ele, S. (2018). Scaling up successfully: Lessons from Kenya's Tusome national literacy program. *Journal of Educational Change*, 19(3), 293-321. <https://doi.org/10.1007/s10833-018-9325-4>
- 136 Piper, Sitabkhan, Mejia, & Betts; see endnote 115.
- 137 Fuje, H., & Tandon, P. (2018). When do in-service teacher training and books improve student achievement? Experimental evidence from Mongolia. *Review of Development Economics*, 22(3), 1360-1383. <https://doi.org/10.1111/rode.12387>
- 138 Piper, Sitabkhan, Mejia, & Betts; see endnote 115
- 139 Kim & Davidson, 2019; see endnote 12.
- 140 Kim & Davidson, 2019; see endnote 12.
- 141 Kim & Davidson, 2019; see endnote 12.
- 142 Evans, N., Srikantaiah, D., Pallangyo, A., Sugrue, M., & Sitabkhan, Y. (2019). *Towards the design and implementation of comprehensive primary grade literacy and numeracy programs. A Working Paper by the Global Reading Network*. Prepared by University Research Co., LLC. (URC) under the Reading within REACH initiative for USAID's Building Evidence and Supporting Innovation to Improve Primary Grade Assistance for the Office of Education (E3/ED). <https://www.globalreadingnetwork.net/resources/towards-design-and-implementation-comprehensive-primary-grade-literacy-and-numeracy>
- 143 Social Impact, Inc. (2019). *Ghana Early Grade Reading Program: Impact evaluation endline report*. Prepared under USAID Partnership for Education: Evaluating Systems, Contract No. GS-10F-0294V. Washington, DC: USAID.
- 144 Aber, J., Torrente, C., Starkey, L., Johnston, B., Seidman, E., Halpin, P., Shivshanker, A., Weisenhorn, N., Annan, J., & Wolf, S. (2017). Impacts after one year of 'Healing Classroom' on children's reading and math skills in DRC: Results from a cluster randomized trial. *Journal of Research on Educational Effectiveness*, 10(3), 507-529. <https://doi.org/10.1080/19345747.2016.1236160>
- 145 Fleisch, B., Schöer, V., Roberts, G., & Thornton, A. (2016). System-wide improvement of early-grade mathematics: New evidence from the Gauteng Primary Language and Mathematics Strategy. *International Journal of Educational Development*, 49, 157-174. <https://doi.org/10.1016/j.ijedudev.2016.02.006>
- 146 Piper, B., Zuilkowski, S. S., Dubeck, M. M., Jepkemei, E., & King, S. (2018). Identifying the essential ingredients to literacy and numeracy improvement: Teacher professional development and coaching, student textbooks, and structured teachers' guides. *World Development*, 106, 324-336. <https://doi.org/10.1016/j.worlddev.2018.01.018>
- 147 Wolf, S., Aber, J.L., Behrman, J.R., & Tsino, E. (2019). Experimental impacts of the Quality Preschool for Ghana interventions on teacher professional well-being, classroom quality, and children's school readiness. *Journal of Research on Educational Effectiveness*, 12(1), 10-37. <https://doi.org/10.1080/19345747.2018.1517199>
- 148 Piper, B., Merseth, K., & Ngaruiya, S. (2018). Scaling up early childhood development and education in a devolved setting: Policy making, resource allocations, and impacts of the Tayari school readiness program in Kenya. *Global Education Review*, 5(2), 47-68.
- 149 Piper, B., Sitabkhan, Y., & Nderu, E. (2018). Mathematics from the beginning: Evaluating the Tayari preprimary program's impact on early mathematical skills. *Global Education Review*, 5(3), 57-81
- 150 Ngware, M. W., Hungi, N., Wekulo, P., Mutisya, M., Njagi, J., Mhuia, N., Wambiya, E., Gathoni, G., & Mambe, S. (2018). *Impact evaluation of Tayari School Readiness Program in Kenya: Endline report, long version*. Nairobi, Kenya: African Population and Health Research Center's Education and Youth Empowerment Unit. https://aphrc.org/wp-content/uploads/2019/07/Impact_Evaluation_ECDE_Tayari-long-report.pdf
- 151 Banerjee, Glewwe et al., 2013; see endnote 65.
- 152 Conn, 2014; see endnote 66.
- 153 Evans & Popova, 2015; see endnote 67.
- 154 Glewwe et al., 2014; see endnote 68.
- 155 Graham & Kelly, 2018; see endnote 69.
- 156 Krishnaratne et al., 2013; see endnote 70.
- 157 McEwan, 2012; see endnote 71.
- 158 Murnane & Ganimian, 2014; see endnote 72.
- 159 Sowa, P., Jordan, R., Ralaingita, W., & Piper, B. (2020). *Designing and implementing successful upper primary interventions: Practical guidelines*. Manuscript submitted for publication. Research Triangle Park, NC: RTI International.
- 160 Ministry of Basic and Senior Secondary Education, Sierra Leone. (2020). *Sierra Leone secondary grade learning assessment*. <https://mbsse.gov.sl/leh-wi-lan/>
- 161 Creative Associates International. (2018). *Northern Education Initiative Plus (NEI+): Early grade reading assessment midline report*. Washington, DC: Creative Associates International.
- 162 Social Impact, 2019; see endnote 140.
- 163 Social Impact, 2019; see endnote 140.
- 164 Schaefer, M., & Kotzé, J. (2019). Early reading skills related to Grade 1 English Second Language literacy in rural South African schools. *South African Journal of Childhood Education*, 9(1), a644. <https://doi.org/10.4102/sajce.v9i1.644>



- 165 Piper, Destefano, Kinyanjui & Ongele, 2018; see endnote 132.
- 166 Piper, B., Zuilkowski, S. S., & Ong'ele, S. (2016). Implementing mother tongue instruction in the real world: Results from a medium-scale randomized controlled trial in Kenya. *Comparative Education Review*, 60(4), 776-807. <https://doi.org/10.1086/688493>
- 167 Brunette, T., Piper, B., Jordan, R., King, S., & Nabacwa, R. (2019). The impact of mother tongue reading instruction in twelve Ugandan languages and the role of language complexity, socioeconomic factors, and program implementation. *Comparative Education Review*, 63(4), 591-612. <https://doi.org/10.1086/705426>
- 168 Piper, B., Zuilkowski, S. S., Kwayumba, D., & Oyanga, A. (2018). Examining the secondary effects of mother-tongue literacy instruction in Kenya: Impacts on student learning in English, Kiswahili, and mathematics. *International Journal of Educational Development*, 59, 110-127. <https://doi.org/10.1016/j.ijedudev.2017.10.002>
- 169 Seid, Y. (2016). Does learning in mother tongue matter? Evidence from a natural experiment in Ethiopia. *Economics of Education Review*, 55(December), 21-38. <https://doi.org/10.1016/j.econedurev.2016.08.006>
- 170 Creative Associates International, 2018; see endnote 158.
- 171 Social Impact, 2019; see endnote 140.
- 172 Brunette et al., 2019; see endnote 164.
- 173 Piper, Zuilkowski, & Ong'ele, 2016; see endnote 163.
- 174 Piper, Schroeder, & Trudell, 2016; see endnote 10.
- 175 Piper, Zuilkowski, Dubeck, Jepkemei, & King, 2018; see endnote 143.
- 176 Seid, 2016; see endnote 166.
- 177 Fuje & Tandon, 2018; see endnote 134.
- 178 Piper, Zuilkowski, Dubeck, Jepkemei, & King, 2018; see endnote 143.
- 179 Cilliers, J., Fleisch, B., Kotzé, J., Mohohlwane, N., Taylor, S., & Thulare, T. (2020). *Can virtual replace in-person coaching? Experimental evidence on teacher professional development and student Learning in South Africa*. RISE Working Paper Series, 20/050. <https://riseprogramme.org/publications/can-virtual-replace-person-coaching-experimental-evidence-teacher-professional>
- 180 Kotzé, J., Fleisch, B., & Taylor, S. (2019). Alternative forms of early grade instructional coaching: Emerging evidence from field experiments in South Africa. *International Journal of Educational Development*, 66, 203-213. <https://doi.org/10.1016/j.ijedudev.2018.09.004>
- 181 Fleisch, B. (2018). *The education triple cocktail: System-wide instructional reform in South Africa*. Cape Town, South Africa: UCT Press.
- 182 Piper, Zuilkowski, Dubeck, Jepkemei, & King, 2018; see endnote 143.
- 183 Piper, B., Kwayumba, D., & Oyanga, A. (2018). *Kenya Tusome Early Grade Reading Programme in Kakuma Refugee Camp: Needs assessment of literacy learning levels*. Prepared for UNICEF under Contract No. 43241538. Research Triangle Park, NC: RTI International.
- 184 Piper, B., Oyanga, A., Mejia, J., & Pouzevara, S. (2018). Implementing large-scale instructional technology in Kenya: Changing instructional practice and developing accountability in a national education system. *International Journal of Education and Development Using Information and Communication Technology*, 13(3), 57-79. <http://ijedict.dec.uwi.edu/include/getdoc.php?id=7416&article=2353&mode=pdf>
- 185 Fuje & Tandon, 2018; see endnote 134.
- 186 Fleisch, B., & Dixon, K. (2019). Identifying mechanisms of change in the Early Grade Reading Study in South Africa. *South African Journal of Education*, 39(3), 1-12. <https://doi.org/10.15700/saje.v39n3a1696>
- 187 Cilliers et al., 2020; see endnote 176.
- 188 Kotzé et al., 2019; see endnote 177.
- 189 Stern, J., Jukes, M., & Piper, B. (2020, March 2). *Is it possible to improve learning at scale? Reflections on the process of identifying large-scale successful education interventions*. Center for Global Development. <https://www.cgdev.org/blog/it-possible-improve-learning-scale-reflections-process-identifying-large-scale-successful>
- 190 King, S. J. (2020). *Fidelity of implementation: contextualizing measurement for sub-Saharan Africa education systems*. Prepared for presentation at annual meeting of the Comparative and International Education Society (CIES); virtual only.
- 191 Poudel, L., & Rai, U. (2019, April 16). *School performance factors in Nepal's National Early Grade Reading Program* [Paper presentation]. Annual meeting of the Comparative and International Education Society (CIES), April 16, 2019, San Francisco, CA.
- 192 Piper, DeStefano, Kinyanjui, and Ong'ele, 2018; see endnote 132.
- 193 Piper, DeStefano, Kinyanjui, and Ong'ele, 2018; see endnote 132.
- 194 Social Impact, 2019; see endnote 140.
- 195 King, 2020; see endnote 187.
- 196 Social Impact, 2019; see endnote 140.
- 197 Riep, 2019; see endnote 114.
- 198 Datnow, A., & Castellano, M. (2000). Teachers' responses to success for all: How beliefs, experiences, and adaptations shape implementation. *American Educational Research Journal*, 37(3), 775-799. <https://doi.org/10.3102/00028312037003775>
- 199 Mourshed, Chijoke, & Barber, 2010; see endnote 41.
- 200 Kenya Institute of Curriculum Development (KICD). (2019). *Basic Education Curriculum Framework*. Nairobi, Kenya: Republic of Kenya, Ministry of Education, KICD. <https://kicd.ac.ke/curriculum-reform/basic-education-curriculum-framework/>
- 201 Sowa et al., 2020; see endnote 156.
- 202 Ministry of Basic and Senior Secondary Education, Sierra Leone. (2020); see endnote 157.
- 203 Mourshed, M., Krawitz, M., & Dorn, E. 2010. *How to improve student educational outcomes: New insights from data analytics*. McKinsey & Company. <https://www.mckinsey.com/~media/McKinsey/Industries/Social%20Sector/Our%20Insights/How%20to%20improve%20student%20educational%20outcomes/How-to-improve-student-educational-outcomes-New-insights-from-data-analytics.pdf>
- 204 Mourshed, Krawitz, & Dorn, 2010; see endnote 200.
- 205 World Bank. (2020). *The Human Capital Index 2020 Update: Human capital in the time of COVID19*. Washington, DC: The World Bank. <https://openknowledge.worldbank.org/handle/10986/34432>
- 206 Hanushek, E. A. (2013). Economic growth in developing countries: The role of human capital. *Economics of Education Review*, 37, 204-212. <https://doi.org/10.1016/j.econedurev.2013.04.005>
- 207 World Bank, 2020; see endnote 202.
- 208 Stern et al., 2020; see endnote 186.
- 209 GEEAP, 2020; see endnote 75.
- 210 World Bank, 2019; see endnote 6.
- 211 Evans, D. K., & Yuan, F. (2019). *What we learn about girls' education from interventions that do not focus on girls*. Working Paper No.



513. Washington, DC: Center for Global Development. <https://www.cgdev.org/sites/default/files/what-we-learn-about-girls-education-interventions-do-not-focus-on-girls.pdf>

212 World Bank, 2019; see endnote 6.

210 Piper, Ralaingita, Akach, & King, 2016; see endnote 122.

211 Evans et al., 2019; see endnote 139.

212 Piper, Merseth, & Ngaruiya, 2018; see endnote 145.

213 Evans et al., 2019; see endnote 139.

214 GEEAP, 2020; see endnote 75.

215 Piper, Zuilkowski, Dubeck, Jepkemei & King, 2018; see endnote 143.