RISE Working Paper 22/093
April 2022

Evaluating Systems: Three Approaches for Analyzing Education Systems and Informing Action

Michelle Kaffenberger, Jason Silberstein, and Marla Spivack

Abstract

While conventional interventions and evaluations address the symptoms of the learning crisis, there is growing acknowledgement that widespread and sustained learning improvements will require systems approaches that diagnose and address the root causes of low learning. This paper presents and applies three methods to evaluate education systems and inform how to improve system coherence for learning. First, we use learning trajectories to evaluate the dynamics of children's learning in 22 low- and middle-income countries. Second, we present a set of principles called the ALIGNS principles and show how they can be used to evaluate and improve alignment of curricula, assessments, and teacher support and instruction. Finally, we present a systems diagnostic framework and apply it to a program in South Africa, showing how the program takes a systems approach to improve learning. These tools help concretize systems thinking and bring insights to bear on the design and evaluation of policies and programs intended to improve learning.

Evaluating Systems: Three Approaches for Analyzing Education Systems and Informing Action

Michelle Kaffenberger
Blavatnik School of Government, University of Oxford
michelle.kaffenberger@bsg.ox.ac.uk

Jason Silberstein
Blavatnik School of Government, University of Oxford
jason.silberstein@bsg.ox.ac.uk

Marla Spivack
Kennedy School of Government, Harvard University
marla_spivack@hks.harvard.edu

This is one of a series of working papers from "RISE"—the large-scale education systems research programme supported by funding from the United Kingdom's Foreign, Commonwealth and Development Office (FCDO), the Australian Government's Department of Foreign Affairs and Trade (DFAT), and the Bill and Melinda Gates Foundation. The Programme is managed and implemented through a partnership between Oxford Policy Management and the Blavatnik School of Government at the University of Oxford.

Please cite this paper as:
Kaffenberger, M., Silberstein, J., and Spivack, M. 2022. Evaluating Systems: Three Approaches for Analyzing Education Systems and Informing Action. RISE Working Paper Series. 22/093.
https://doi.org/10.35489/BSG-RISE-WP_2022/093

Introduction

Systems thinking emphasizes the complex complementarities (Mbiti et al. 2019) and feedback loops that exist between different parts of a system, such that the effectiveness of any specific input or program is affected by the wider system and produces an emergent, often unexpected outcome (Pritchett 2015). Systems methods therefore deemphasize *what* works, and try instead to understand *how* the parts of the system fit together—or pull at cross purposes—to produce observed outcomes. The Research on Improving Systems of Education (RISE) Programme has sought to develop methods to evaluate education systems and point toward how to make their constituent parts more coherent for learning (Pritchett 2015; Spivack 2021).

Understanding how education systems deliver learning is critical in light of the global learning crisis. Nine out of 10 children in low-income countries cannot read and understand a simple text by age 10. The same is true for only 1 out of 10 of their peers in high-income countries (World Bank 2019). Although some of these children never went to school, the vast majority have spent years in school without learning to read (Save Our Future 2020). Despite almost all countries having made historic progress toward near-universal primary school enrollment, the amount that children learn in school in many countries has stagnated or even declined in recent decades (Le Nestour et al. 2022). There is increasing recognition that these trends constitute a learning crisis in developing countries (World Bank 2018; UNESCO et al. 2021).

Increased attention to the learning crisis has driven demand for better methods to diagnose its root causes. One effort in this direction has been increased scholarly attention to systems thinking in education (Pritchett, 2013; Faul and Savage, forthcoming). This turn has been driven in part by the shortcomings of conventional approaches to education reform, which typically seek to improve a single educational input at a time (textbooks, infrastructure, teacher qualifications) without developing a theory of why those inputs are deficient in the first place. The methodological counterpart to these conventional approaches has been a large literature of impact evaluations which, while well-identified, have been unable to explain the radical heterogeneity of impact across contexts (Evans and Popova 2016) or offer widely generalizable insights into the complex and highly context-dependent causal chains that mediate between an intervention and its outcomes. Would-be reformers are left with little guidance on what to prioritize to tackle the learning crisis in their particular education system.

This paper lies at the intersection of the learning crisis and systems thinking. We offer three tractable methods for evaluating education systems to better understand and ameliorate the root causes of the learning crisis. We illustrate each method through presenting empirical findings from a range of low- and middle-income country contexts.

Section 1 presents learning trajectories, a tool for evaluating the dynamics of learning as children progress through school. We leverage an international household survey, relying on observational cross-sectional data, to build learning trajectories for 22 low- and lower-middle-income countries and regions. Analysis of these trajectories demonstrates three key dynamics about learning: the year-on-year pace of learning is far too low; this slow pace of learning begins in the earliest years of primary school and compounds over time; and these trends are true for

most children, not just disadvantaged groups. Any effective intervention will need to account for the system dynamics of the learning crisis made visible by learning trajectories.

Section 2 argues that a primary driver of these observed dynamics is instructional incoherence, or the disconnect between the level of curriculum and instruction compared with what children know and can do. To evaluate incoherence in instruction, we present a set of principles that collectively call for Aligning Levels of Instruction with Goals and the Needs of Students (ALIGNS) principles (Hwa et al. 2020). We show how these ALIGNS principles provide a flexible model for making the key components of the instructional subsystem more internally coherent and how this has led to improvements in learning in a variety of programs.

Approaches to align instruction with children's learning levels and needs are themselves embedded within the larger education system. Section 3 uses the RISE education systems framework to evaluate how a program took a systems approach to pursuing the ALIGNS principles. We apply the framework to the approach of Funda Wande, a nongovernmental organization in South Africa, and analyze the multiple parts of the system it engaged to successfully improve foundational learning. We also use the Funda Wande program to illustrate how the framework can be productively applied to situate any program within the wider system and analyze its coherence with other parts of the system.

Section 4 concludes with a discussion of how to apply these three tools and principles of systems thinking to begin to address the learning crisis in other low- and middle-income country contexts.

1. Learning trajectories: An empirical tool for education systems analysis

Learning trajectories provide insights into the dynamics of children's learning. Learning trajectories[1] describe how a skill level evolves over time. In this section, we focus on analyzing trajectories that show how children's mastery of foundational skills, such as reading and numeracy, evolve as they progress through primary school.

Learning trajectories offer a perspective on education systems that is distinct from other, more common tools used to analyze learning. Most national assessments and international assessments tend to test students of just one age or grade.[2] They produce a snapshot of learning in just the grade that is covered, and come relatively late in the schooling cycle. In contrast, learning trajectories use data from assessments that are administered to children of multiple ages or grades, and therefore show learning progression. In this way, learning trajectories offer a clearer diagnosis of system dynamics than typical learning outcomes data: they can establish not just the existence of the learning crisis, but also essential patterns in it. Recognizing these patterns can

[1] Some papers we cite use the term *learning profiles*; we use *learning profiles* and *learning trajectories* synonymously.

[2] For example, many countries administer national school-leaving exams at the end of primary and secondary school. International assessments include, among others, the Organisation for Economic Co-operation and Development's Programme for International Student Assessment, which is conducted with 15-year-olds still enrolled in school.

inform high-level prioritization of which policies do, and do not, stand a chance of significantly addressing the learning crisis in a particular context.

Below, we analyze learning profiles across 22 low- and lower-middle-income countries to answer three key questions about the dynamics of children's learning in these countries:

1. Is schooling translating into learning?
2. When do children start to fall behind, and how does this shape later outcomes?
3. Are the answers to these questions different for advantaged and disadvantaged groups within countries (for example, the poor vs. the better off; boys vs. girls)?

We address these questions by building and analyzing learning trajectories using data collected by UNICEF in the sixth round of the Multiple Indicator Cluster Surveys (MICS6), administered between 2017–2020. The MICS data set is the largest international household survey with a nationally representative module on children's foundational learning (covering both children in and out of school). We include MICS6 data from all 22 publicly available low- and lower-middle-income countries and regions.[3] The sixth survey round includes, for the first time, a module for children ages 7–14 measuring foundational reading and numeracy skills.

The assessment is calibrated to Sustainable Development Goal (SDG) 4.1.1, which calls for all children to reach "minimum proficiency" in reading and mathematics by grade 2/3. Achieving reading or numeracy on the MICS6 assessment is equivalent to reaching the SDG of minimum proficiency for each subject area. This minimum standard of proficiency has been adopted by nearly every country in the world through their commitment to the SDGs.[4]

We focus our analysis on reading skills, which reflect whether a child could read aloud a grade 2–3 level short story of around 70 words and answer five simple questions about it.[5] The findings generally agree with the wider literature on learning trajectories analysis, which has drawn on multiple data sets from around the world.[6]

[3] The 20 countries and two Pakistani provinces in the data set are Bangladesh, Central African Republic, Chad, Democratic Republic of Congo (DRC), The Gambia, Ghana, Guinea Bissau, Madagascar, Kiribati, Kyrgyzstan, Lesotho, Mongolia, Nepal, Palestine, Punjab (Pakistan), Samoa, Sao Tome and Principe, Sierra Leone, Sindh (Pakistan), Togo, Tunisia, and Zimbabwe.

[4] SDG Indicator 4.1.1 measures the "proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex."

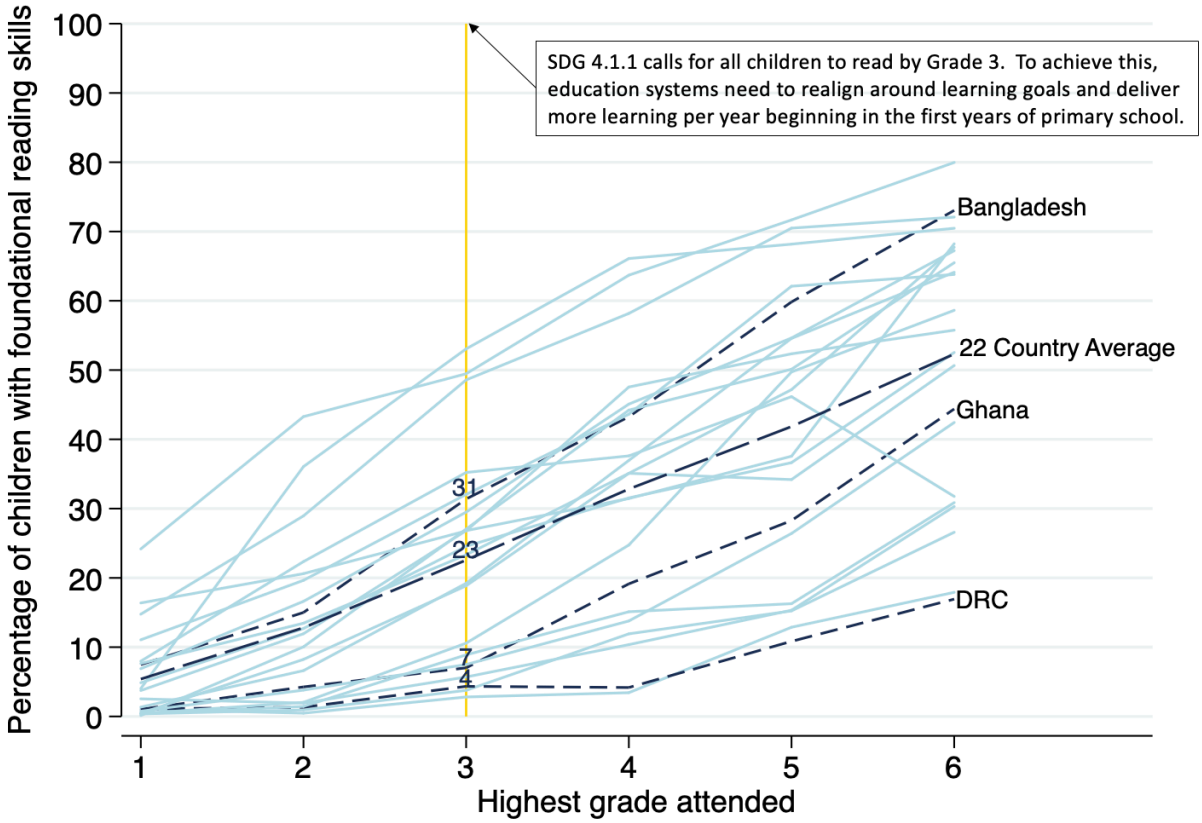
[5] The threshold to pass the reading test was set as correctly reading 90 percent of the words in the approximately 70-word story, and then correctly answering all five questions (three literal questions and 2 inferential questions). If a child read less than 90 percent of the words correctly, or if they answered a single question incorrectly, they failed the reading test. This relatively stringent threshold is best thought of as a measure of mastery of foundational reading skills. Note that the MICS6 assessment measures reading accuracy and comprehension, but not fluency (there was no timed component to the test).

[6] These include data sets as diverse as the Demographics and Health Surveys, Financial Inclusion Insights surveys, citizen-led assessments including ASER (in India) and Uwezo (in Kenya, Tanzania, and Uganda), and the Indonesian Family Life Surveys. Analysis of these and other data sets are collected in a special issue of the *International Journal of Educational Development* (Kaffenberger, Crouch, and Savage 2021).

1.1. Systems must increase learning per year beginning in the earliest years of primary school

The first feature of education systems revealed by the MICS6 learning trajectories is the strikingly low absolute level of learning in all countries in the data set (Figure 1). In the average country, only 23 percent of grade 3 students can read. In only 2 out of 22 countries do *half* of grade 3 students achieve foundational reading skills. Furthermore, low learning persists. Even by the end of primary school, only 52 percent of grade 6 students in the average country have gained foundational reading skills (which the SDG expects by the grade 2–3 level).

Figure 1: Learning trajectories from 22 countries reveal that foundational learning is far short of global goals and that children fall behind early in primary school



Source: Authors' calculations using MICS6 data. Data are representative of children in 22 countries and regions, all of which are low or lower-middle income. The threshold for foundational reading skills follows the definition in UNICEF (2020).

These low learning levels reflect large shortfalls in reaching the SDG for foundational skills. To reach the SDG for universal reading achievement, learning trajectories would need to be steep enough to reach 100 percent by grade 3. Instead, in most countries, most children are not

reaching this goal. Even when children are in school, they are not learning enough each year to reach even basic learning goals.[7]

Shallow learning trajectories suggest that expanded access to schooling will not address the learning crisis. Other analysis has similar findings. Analyzing learning trajectories for 50 countries with Demographic and Health Surveys data, Pritchett and Sandefur (2020) find that among young women with six years of schooling and no higher, on average only half can read a simple sentence in a language of their choosing. The study suggests that even if all women had completed grade 6, 40 percent would remain functionally illiterate. Kaffenberger and Pritchett (2020) similarly find that across 10 low- and middle-income countries, half or less of young adults (men and women) who have completed primary school are functionally literate. Addressing the learning crisis will require much steeper learning trajectories.

A second dynamic of education systems visible in Figure 1 is that low learning trajectories have their origins in early primary school. By grade 3, children are already far behind global goals. Furthermore, most national curricula assume that children have learned to read by grade 3. Children who have not gained this foundational skill will begin to fall behind as the curricula assumes children can read. Because many assessments (such as national school-leaving exams and international assessments) occur late in the schooling cycle, much attention goes to low learning levels at the end of primary school or in secondary school. However, learning trajectories reveal that learning shortfalls begin much earlier. Efforts to steepen learning per year therefore are needed beginning in the early primary school grades to ensure that children master foundational skills.

A third systems dynamic that the learning trajectories make visible is that once children fall behind, they then tend to stay behind. Low learning persists. There is no country in the data set where the rate of learning per year increases dramatically enough after grade 3 to enable all children to catch up by grade 6. Even the relatively better-performing countries in the data set, such as Bangladesh, have a persistently shallow slope that leaves more than 1 in 4 children in grade 6 without foundational skills (which are expected by the SDG in grades 2–3).[8]

Progress in the earlier years of school shapes later outcomes: the less a child learns in the early years of school, the less that child tends to learn in the later years. This makes sense because learning is a cumulative process where foundational skills are the scaffolding needed to learn higher-order skills (Belafi, Hwa, and Kaffenberger 2020). Said intuitively, children need to be able to read letters before words, and to read words before they can understand paragraphs.

[7] Furthermore, the learning trajectories in Figure 1 are likely to be biased upward. In countries with high non-enrollment or high dropout, the children assessed in higher grades are likely to represent a subset of higher performers (Kaffenberger, Sobol, and Spindelman 2021). Therefore, these learning trajectories represent upper bounds of true learning per grade; true learning is likely even lower.

[8] There is, of course, large variation in trajectories between countries. The variation in learning trajectories highlights the importance of analyzing learning trajectories for a particular context, as dynamics and therefore policy implications will differ. However, across the countries in Figure 1 even the best performers are far behind—in terms of trends and levels—on any reasonable absolute scale of learning.

Considered together, these dynamics point to the need for better instructional alignment in education systems. When children fail to learn foundational skills in the early grades, they quickly fall behind the pace of learning assumed by most curricula. As learning goals and curricula advance year-on-year, the misalignment between what is expected of children and what they can actually do compounds. These children fall ever further behind as they become increasingly less able to engage with classroom instruction. The shallow early trajectories seen in all countries in the data set remain shallow for the remainder of schooling. Other studies have related findings. A study in Indonesia found that the proportion of children who could complete a set of basic mathematics problems increased each year through grade 6, after which it flattened off (Beatty et al. 2021). Children who had not gained these skills by grade 6 did not gain them subsequently—they were left behind by the curriculum. Often children with lower learning drop out of school, limiting their future learning even further (Kaffenberger, Sobol, and Spindelman 2021).

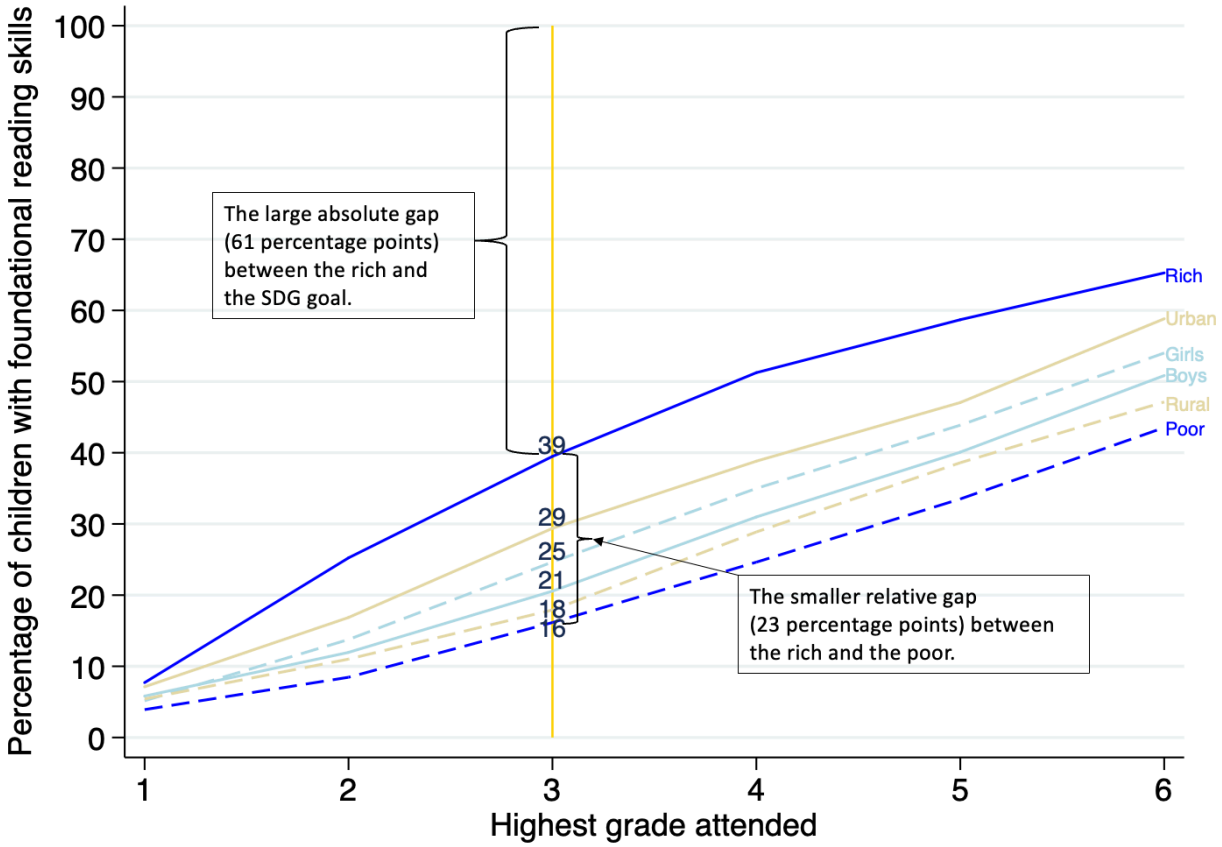
The dynamics of children's learning over time reveals the need for instructional realignment beginning in the earliest years of primary school, and following principles and diagnostics such as those described in Sections 2 and 3 below.

1.2. Learning is low for all demographic groups, pointing to the need for system-wide rather than targeted interventions

Learning trajectories can also be disaggregated to see if there are different dynamics at play for various demographic groups. Figure 2 shows that although there are important differences between more and less advantaged groups, these relative differences are small next to the overall gap to learning goals like the SDG. For example, averaging across the 22 countries, around 39 percent of children from the richest quintile of families in the typical country have gained foundational reading skills by grade 3, which is about 23 percentage points higher than for their peers in the poorest two quintiles. However, this gap is small in comparison to the 61 percent of rich children who can't read. Even by Grade 6, only about two-thirds of children from the richest quintile can read at a skill level expected by the SDG three or four years earlier in school. Other learning trajectory analysis has similar findings confirming that even the most advantaged groups are often very far away from learning goals (Pritchett and Viarengo 2021).

Another instructive pattern in Figure 2 is the relative trajectories of boys and girls. Averaging across all 22 countries, the differences in learning between genders is less than 5 percentage points throughout primary school, and it is girls who hold a slight edge over boys in assessed skill levels. Although there is more variation at the country level, the same general patterns hold. Averaging within each country across the six primary grades, there are only 5 countries where boys' and girls' reading skills are separated by more than 5 percentage points, and in all 5 countries it is girls who are ahead of boys.

Figure 2: Learning trajectories averaged across 22 low and low-middle income countries show that learning is low for both advantaged and disadvantaged groups



Source: Authors' calculations using MICS6 data. Data are averaged across 22 countries and regions, all of which are low or low-middle income. The threshold for foundational reading skills follows the definition proposed in UNICEF (2020).

These data suggest that current education systems are broadly failing all groups of children, both the advantaged and disadvantaged. Reform agendas that target interventions to disadvantaged groups in the hopes of achieving equality with advantaged groups, whatever their justification on other grounds, will only partially address the learning crisis. Rather than redistributing resources within the current system toward specific demographic groups, these learning trajectories suggest a need for making structural realignments in the system that will increase learning for all children.

2. Principles for aligning instruction for learning

The three main findings based on learning trajectories in Section 1 are consistent with a need to better align education systems for learning. Low learning and shallow learning trajectories partly result from children falling further behind the level of the curriculum and instruction with each progressive year of schooling. In many countries curricula and instruction are overambitious relative to the actual quality of instruction, moving too fast for children to keep up (Pritchett and Beatty 2012; Kaffenberger and Pritchett 2020). When children do not master foundational skills like reading and mathematics in the early primary years, they are not able to engage in more

advanced topics in later grades (Belafi et al. 2020; Gordon et al. 2019). In India, for example, a study that assessed children against grade-based standards found that many children in grades 7 and 8 were at only a grade 2 curricular level (Muralidharan 2019; Muralidharan and Singh forthcoming). The official curriculum was five to six years ahead of these children's mastery levels.

Furthermore, when learning is low on average, there is often wide variation in learning levels among children in the same grade. The same study in India found that learning levels of children in grade 8 varied from a grade 2 learning level to a grade 8 learning level, and everything in between (Muralidharan 2019; Muralidharan and Singh forthcoming). In situations like these, instruction that follows the official curriculum may be aligned only with the learning levels of the highest-performing children who are on par with grade-level expectations, widening preexisting inequalities by teaching to the top performers.

Misalignment, therefore, between children's learning levels and needs on one hand and the level of curriculum and instruction on the other hand, is common. Such misalignment is also likely to be exacerbated by the school closures and lost learning resulting from the COVID pandemic, making programs that improve alignment all the more critical (Angrist et al. 2021). In recent years many programs and reforms have been implemented to better align instruction with children's learning levels. Improving this type of alignment helps students master foundational skills that are prerequisites for more advanced skills and helps them continue learning for longer.

Programs that have improved alignment between instruction and children's learning levels share four key principles (Hwa et al. 2020). The principles are referred to as the ALIGNS principles, which stand for Aligning Levels of Instruction with Goals and the Needs of Students. These principles emerged from a review of cognitive science literature on how children learn, educational research at the classroom level, evaluations of programs aiming to improve instructional alignment, and a desk review of 12 types of approaches that have been collectively implemented in more than 30 countries. In this section, we describe the four principles identified in Hwa et al. (2020) and discuss empirical examples of these principles in action. In Section 3, we discuss the importance of applying these principles through a systems approach and describe one case in more detail that took a systems approach to improving alignment for learning.

The four principles that are common across approaches that improve instructional alignment are as follows:

Principle 1. Set clear goals for children's learning progress in line with children's current learning levels.

In most low- and middle-income country contexts, particularly for primary school–aged children, setting goals in line with children's current learning levels means focusing on foundational literacy and numeracy skills (Belafi et al. 2020). Such goals typically relate to ensuring universal mastery of these foundational skills. For example, the Tusome program, a structured pedagogy program in Kenya, set clear foundational literacy goals for students in grades 1, 2, and 3. The goals included achieving benchmarks for reading fluency in Kiswahili and English (Piper et al. 2018).

Setting appropriate learning goals requires an adequate understanding of current learning levels. To this end, many types of learning assessments have been used to inform learning goals. Citizen-led assessments, such as the ASER and Uwezo assessments[9]; national, regional, and international assessments; and program-level assessments administered at the beginning of a program have been used to inform action on setting learning goals and improving learning outcomes (Crouch 2020; Loureiro and Cruz 2020; Kaffenberger and Spivack 2022; Piper et al. 2018; Gove and Wetterberg 2011). In the Tusome example, poor results on Uwezo assessments and Early Grade Reading and Math Assessments provided a wake-up call on poor literacy achievement, driving action and informing appropriate goals.

Principle 2. Align instruction to be coherent with children's current learning levels and targeted learning progress.

Different approaches to improving alignment act on different components of instruction, including national curriculum standards, the content taught in the classroom, teaching and learning materials, support to teachers, assessments used to evaluate students' progress, and others. Many approaches that were reviewed by Hwa et al. (2020) changed multiple instructional components simultaneously, bringing the components into alignment with each other as well as with children's learning progress, rather than simply changing one component at a time.

Tanzania, for example, undertook a major curriculum reform to better align the grades 1 and 2 curriculum with children's needs. A policy document by the Ministry of Education, Science and Technology stated that, "the Curriculum for Standard I and II was overloaded with subjects . . . placing less emphasis on the development of the basic skills and competencies in reading, writing and arithmetic that are necessary in order for learners to effectively learn content" (Ministry of Education, Science and Technology 2016). The reform radically reoriented the curriculum, dedicating 80 percent of instructional time to literacy in Kiswahili and mathematics and included new instructional materials and training and support to teachers. An external evaluation estimates that it resulted in large improvements in children's learning in both subjects (Mbiti and Rodriguez-Segura forthcoming).

In other contexts, programs repurposed existing literacy or mathematics instructional time to prioritize foundational skills and align instruction with children's current learning levels and needs. This often involved the development of new learning materials and assessments, aligned with children's learning levels and the goals set under Principle 1, and support to teachers to implement the new approach.

Principle 3. Provide effective and coherent support to teachers and other instructors.

Adapting instruction to align with children's learning levels is a nontrivial undertaking for the teachers and instructors involved. Many approaches that succeed in aligning classroom instruction with children's learning levels and needs do not confine training to the beginning of the program. Instead, they often provide ongoing coaching so that teachers receive continuous feedback for incremental improvement (Hwa et al. 2020). The feedback, furthermore, is typically

[9] For more on these assessments, see asercentre.org and uwezouganda.org.

focused on reinforcing the key changes to instruction in the program or reform, such as ways of employing new pedagogy, materials, and lesson plans. Coaching also serves as a low-stakes accountability mechanism to that ensure teachers and instructors are implementing the approach appropriately. Intensive support to teachers is particularly necessary in low-capacity systems where teachers often have weak content knowledge (as measured by surveys such as the Service Delivery Indicators) and follow entrenched norms which require continuous follow-up to shift (Popova et al. 2021).

For example, Funda Wande, a nongovernmental organization in South Africa, provides ongoing support to teachers through multiple means. The first is through the provision of a comprehensive curriculum and set of instructional support materials for teachers for early grade reading and math. These include integrated lesson plans, instructional videos, learner activity books, and anthologies[10] (Evans and Sorto 2021). An independent evaluation of the early grade reading materials concluded that this integrated package amounted to substantial support for teachers (Mason and Snow 2021). In addition, in the areas where the organization operates, Funda Wande staff train teachers on the learning goals, new curriculum, lesson plans, and other materials involved in the program as well as ongoing coaching and support.[11] Ongoing coaching and support include visiting teachers and schools at regular intervals to observe teachers' instruction and provide constructive feedback and suggestions to help them implement the new approaches (Ardington and Henry 2021; Ardington 2021).

Principle 4. Tailor implementation to the opportunities and constraints of the context.

There is no one-size-fits-all approach to aligning instruction with children's learning levels and needs. Across the programs reviewed in Hwa et al. (2020), many different approaches were implemented, from national-level curriculum reforms to pilot- or project-level instructional support efforts. A feature that enables a program to work in one context may hinder it somewhere else (Pritchett 2017), and successful programs make a range of choices to adapt an approach to the context in which it is being implemented.

For example, the Tanzania curriculum reform, discussed earlier in this section, focused on alignment at the national level. It reformed the national curriculum standards to align with the perceived needs of all or most grade 1 and 2 students—namely, to have more emphasis and instructional time given to foundational literacy and numeracy. Also at the national level, Atuhurra and Kaffenberger (2020) use the Surveys of Enacted Curriculum to diagnose misalignment between national curriculum standards, national primary leaving exams, and teachers' instruction in the classroom in Uganda and Tanzania. Such a diagnostic can be used to inform ways to improve alignment at this level.

Other approaches focus on alignment at different levels, such as at the student level. Teaching at the Right Level (TaRL) approaches involve conducting simple literacy and numeracy assessments and grouping students with others at their same level of current mastery (Banerji and

[10] For examples of these teacher resources see the Funda Wande website, https://fundawande.org/.
[11] The organization operates directly in Eastern Cape and Limpopo states of South Africa.

Chavan 2016). Instruction is focused explicitly on the group's current learning level, with the goal of moving them up to the next level.

Understanding the system and system dynamics can help identify the opportunities and constraints in the context. This in turn can help inform the level of intervention and kind of approach that is most appropriate in that context.

These four principles are shared across many approaches in many contexts around the world. For them to have lasting impact, it is important that the principles not be implemented in isolation. Approaches to align instruction with children's learning levels and needs must be embedded in a systems approach that takes advantage of system-level opportunities and addresses system-level constraints (Pritchett 2015; RTI 2021). The next section is a deep dive into one program that took a systems approach to achieve results.

3. Alignment for learning viewed through a systems framework

One example of an approach that exemplifies the principles in Section 2 through a systems-oriented approach is the work of Funda Wande in South Africa. Rather than operating as an isolated program, this nongovernmental organization works to affect multiple system levers at once to bring about results. Furthermore, it has done so in a way that has improved foundational learning. Independent evaluations of the curricular materials underlying Funda Wande's approach have found that they promote universal mastery of basic reading and math and provide comprehensive support to teachers to achieve this (Mason and Snow, 2021; Evans and Sorto 2021). Preliminary evaluations of their impact on children's ability to read found significant improvements, with an average 0.19 standard deviation improvement in reading proficiency across seven reading indicators (Ardington 2021). A second evaluation found that Funda Wande's programming increased the portion of grade 1 students who could read least one word by 14 percentage points, and those that could do subtraction by 10 percentage points (Ardington and Henry 2021).[12]

In this section, we describe a systems framework that can be used for diagnosing system misalignment, informing action to improve alignment, and understanding successful efforts to reorient systems for learning. We then apply this systems framework to the Funda Wande experience, describing how Funda Wande not only addressed instructional misalignments but did so through a system-oriented approach.

3.1. A framework for analyzing education systems

A growing body of work points to the importance of system coherence for learning in achieving results for children (Pritchett 2015; Crouch 2020; Kaffenberger 2021). A systems framework can

[12] The first evaluation was of Funda Wande's program in Eastern Cape, and the second was of the organization's program in Limpopo. Both programs and evaluations were affected by the COVID pandemic in different ways. Please see Ardington (2021) and Ardington and Henry (2021) for more details.

be helpful for providing structure to analysis of system coherence and incoherence for learning (see Chapter 8.1 by Powers and Paulsell in this volume).

The RISE education systems framework, an extension of the accountability relationships proposed by the 2004 World Development Report, is one useful approach for this type of analysis (Pritchett 2015; Spivack 2021). It encompasses the actors in an education system, which include the government agencies, public and private sector organizations, and individuals at all levels of the system. It also includes the features of the system through which these actors interact. It uses the concept of principal-agent relationships to describe the interactions between actors and features in a system. The four key relationships represented in the systems framework are as follows:

1. **Politics:** the relationship between citizens and the highest executive, legislative, and fiduciary authorities that carry out the functions of the state.
2. **Compact:** the relationship between the highest executive, legislative, and fiduciary authorities and education authorities and organizations that provide education services.
3. **Management:** the relationship between education authorities and organizations and school leaders and teachers providing services to children.
4. **Voice & Choice:** the relationship between parents, children, and communities and school leaders and teachers.

The five features through which these four relationships interact are as follows:

1. **Delegation:** objectives or tasks the principal expects the agent to fulfill.
2. **Finance:** the resources the principal provides to the agent for the task(s).
3. **Information:** observations and data the principal uses to assess the agent's performance.
4. **Support:** training and preparation the principal provides to equip the agent to fulfill the task.
5. **Motivation:** how the principal motivates the agent to achieve the task(s).

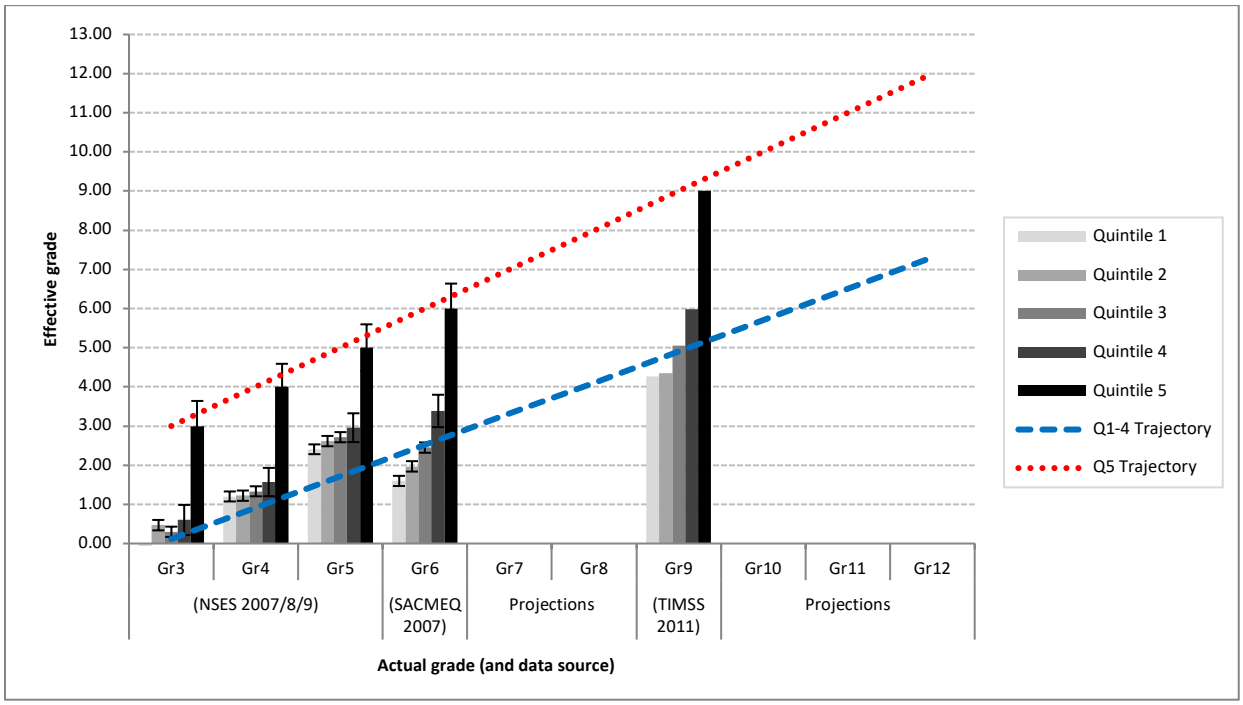
The four key relationships and five features can be combined into a 5 × 4 matrix (Table 1). Many interventions in education systems focus on activities in one cell of the framework. For example, a teacher training program may fall in the Management-Support cell (as education authorities provide support to teachers). However, the framework encourages consideration of how any one cell interacts with others. If the teacher training (in the Management-Support cell) is not aligned with the curriculum teachers are required to use (in the Management-Delegation cell, as education authorities delegate a curriculum to teachers) or the outcomes used to evaluate teacher performance (in the Management-Information cell, as education authorities collect data on teacher performance), then it is less likely to succeed (Spivack 2021).

Analyzing Funda Wande's efforts to improve foundational learning through the lens of this systems framework reveals how they affected multiple elements in the system (multiple cells in the matrix) to bring about improved alignment for learning.

3.2. A case study of Funda Wande

Funda Wande was founded in 2017 by a coalition of philanthropists, academic researchers, and education experts. It set a goal of ensuring that all children in South Africa would be able to read for meaning and calculate with confidence by age 10—an ambitious goal in a country where 78 percent of 10-year-olds lacked basic literacy. Its goals were informed by analysis of learning trajectories, based on national and international assessments for South Africa (Spaull and Kotze 2015). Figure 3, drawn from the study, shows the effective grade (that is, the grade reflected in children's performance) in mathematics for children in grades 3, 4, 5, 6, and 9 by income quintile. Assuming that children in quintile 5 (the top income group) roughly track grade-level expectations, the authors find that the bottom four quintiles are on average three years behind expected learning for their grade (Spaull and Kotze 2015). This analysis aligns with Principle 1 in Section 2, as assessment data were used to inform goals in line with children's learning levels and needs.

Figure 3. 1Mathematics learning trajectories for South Africa by national socioeconomic quintiles



Notes: Mathematics learning trajectories from National School Effectiveness Survey 2007, 2008, 2009 grades 3, 4, and 5, and SAQMEC 2007 grade 6, and Trends in International Mathematics and Science Study grade 9. Bars show 95% confidence intervals.

Source: Spaull and Kotze 2015, with updated graph provided by authors.

The founding team further identified key factors that were contributing to low learning. One was that teachers' content knowledge was poor. One assessment of teachers found that a high proportion of grade 6 teachers were unable to answer grade 6 math questions that their students

would be expected to complete (Spaull 2015). Furthermore, although education authorities delegated instruction in foundational reading and math skills in local language in early grades, there was little support to enable to teachers to do this (Samji and Kapoor 2021). There was insufficient preservice training in the pedagogy of foundational skills instruction, virtually no training in how to teach in local language, and insufficient teaching materials and readings for children in these languages. Moreover, financing and availability of teaching materials varied across schools and neighborhoods (Samji and Kapoor 2021).

Finally, the founding team understood the importance of gathering information about the system and operating at a systems level. This was important both to better understand the problems the system faced and develop potential solutions, and to build buy-in among stakeholders, particularly in government, for making changes (Samji and Kapoor 2021).

The team intentionally set out to improve the government education system, working in and with public schools, rather than working in parallel to them. They determined that achieving universal literacy would require reaching every child, and the philanthropic sector in South Africa is small compared to the government's reach. They concluded, therefore, that the best use of philanthropic money would be to leverage it to influence the government to make foundational skills a priority and improve public school teachers' ability to deliver foundational learning (Spaull 2021).

Armed with this understanding of the challenges their system faced, the Funda Wande team set out to iteratively develop solutions to this challenge. Their efforts, which hew closely to the ALIGNS principles discussed in Section 2, began in Eastern Cape and later expanded to two additional states. It had three primary strands:

(i) Develop teaching and learning materials to support good teaching, and make these affordable and accessible to all. Funda Wande developed suites of teaching and learning materials in local languages, aligned to the government curriculum, and officially approved by government authorities in states where they work (Funda Wande 2019). These included teachers guides with lesson plans as well as learner activity books and reader anthologies for children to go along with the lessons. All of these were available in the local languages and adapted to be fit for purpose in instruction in local language (Mason and Snow 2021; Evans and Sorto 2021). Recognizing that finances can be a barrier, Funda Wande printed many stories together in graded anthologies and published them under a creative commons license to reduce their costs (Funda Wande 2019). In the systems framework, these efforts brought support in line with delegation in the management relationship (A and E in Table 1). Funda Wande also recognized that lack of finance can be a barrier to accessing materials and were mindful to develop suites of materials that would be affordable to low-performing schools (D in Table 1).

Table 1. RISE 5 × 4 Framework with Funda Wande activities mapped

Five design elements	**Principal–agent relationships of accountability**			
	Politics	**Compact**	**Management**	**Voice & Choice**

Delegation		**A** • Build government support for the foundational learning agenda with clear goals (100% of children reading for meaning and calculating with confidence by 2030)	**C** • Align materials and training with government mandate to teach in local languages • Ensure that materials are aligned with mandated curriculum and officially sanctioned by authorities	
Finance		**B** • Focus attention on leveraging philanthropic money to improve public sector performance	**D** • Develop reading materials for children in local language, print them in anthologies to reduce costs and make them affordable for low-performing schools	
Support			**E** • Develop teacher training and coach training programs aimed at preparing teachers to teach reading and basic math in local languages	
Information				
Motivation			**F** • Offer teacher trainings in foundational skills instruction as part of a degree certificate at a university	

Source: Adapted from Pritchett (2015), with Authors' analysis of Funda Wande activities.

(ii) Cultivate teachers' practical teaching skills. Funda Wande developed detailed training courses to develop teachers' ability to provide foundational instruction in local languages. In addition to directly providing this training, they produced videos of trainings and made all the trainings and materials available online. Furthermore, Funda Wande has developed an Advanced Certificate in Early Literacy at Rhodes University for heads of department, teachers, literacy practitioners, and coaches in consultation with the State Department of Education and oriented to align with state requirements (Taylor 2021). Offering the course as a certificate program acknowledges the importance of teacher professional development and creates incentives and motivation for teachers to go through the training for their own professional advancement (F in Table 1) (Hwa and Pritchett 2021). These efforts further bring support into alignment with delegation (E in Table 1).

(iii) Build government support for the foundational learning agenda and maintain authorization and uptake of Funda Wande's work in government. Finally, recognizing that the government is the biggest spender and agenda setter in education, Funda Wande undertook significant policy engagement efforts both to build and maintain authorization for their programs and also more broadly to influence government priorities (Samji and Kapoor 2021; Spaull 2021; Taylor 2021). Outcomes of these efforts include the successful adoption of Funda Wande materials as government-sanctioned instructional materials. More broadly, the organization has seen notable success in advancing its "reading for meaning" message and associated priorities throughout the system. Examples include inclusion of a national reading goal in State Education plans, mention of a national reading goal in a presidential speech in 2019, and the launch of a national 2030 Reading Panel drawing national attention and policy commitment to achieving universal reading for 10-year-olds by 2030 (Kapoor and Samji 2021; 2030 Reading Panel, 2022). Taken together, these efforts illustrate the work Funda Wande has done to build and maintain delegation for foundational learning, particularly in the Compact relationship (A and B in Table 1).

Conclusion

The growing urgency and relevance of the learning crisis in low- and middle-income countries has fostered a methodological turn toward using systems approaches to evaluate the drivers of the crisis and possible solutions to it. In this chapter, we contribute to efforts to translate systems thinking from a conceptual approach into an empirical subdiscipline within education. We do this by applying and presenting findings from three methods for systems thinking in education: learning trajectories; the ALIGNS principles; and the RISE systems framework.

These methods, and our findings, are relevant to education reformers interested in improving learning at scale in at least two ways. They can each be used to *diagnose* the degree of coherence in an education system that is constraining or enabling learning, and to *prioritize actions* that will make the system more coherent for learning (Kaffenberger and Spivack 2021). Both use cases are applicable at multiple points in a policy or program's lifecycle. During the ex ante program design stage, these methods can guide how to shape a policy or program so that it fits within the

wider system and stands the best chance of being interpolated in ways that improve learning. The same methods can also be applied for ex post evaluation to understand how a policy or program was more or less coherent with the wider system and why this (in)coherence translated into a greater or lesser impact on learning.

Learning trajectories often reveal system-level dynamics that are, in general, poorly understood. Many policies and programs are ineffective, at least on the margin of improving learning, because they fail to take these dynamics into account. For example, disproportionate resources are directed to catch-up efforts in the later schooling years that precede school-leaving exams, when learning trajectories reveal that in fact children begin to fall behind in the earliest years of primary school when they struggle to master foundational skills. Other programs exclusively focus on the relative differences between groups without acknowledging the larger systemic problems affecting the advantaged and disadvantaged alike. Building and analyzing learning trajectories is a first step to understanding how and when to intervene to improve learning in any specific education system.

The dynamics reflected in learning trajectories analyses point to a common diagnosis of system incoherence: instruction is often incoherent with children's actual learning levels. Instruction, however, is its own complex subsystem with multiple moving parts, which makes it difficult to know how to intervene. This is where our second tool, the set of four ALIGNS principles, is applicable. These principles distill the key parts of the instructional subsystem that are often incoherent with each other. The principles underscore that there is no single programmatic silver bullet to improving instruction, but rather there are principles that must be flexibly adapted to the opportunities and constraints in a particular education system. These principles guide program design by ensuring that prospective interventions incorporate all principles, rather than trying to act on single parts of the instructional subsystem in isolation.

The third tool discussed, the RISE education systems framework, has multiple potential uses, all of which center on identifying the degree of coherence between the relationships and sub-elements that constitute the framework. Although we apply it in this chapter to better understand the success of a program that incorporates ALIGNS principles, it can be used to evaluate any education program or policy. It can also be used ex ante to diagnose the areas of coherence and incoherence in an education system and to inform entry points where a program or policy could catalyze greater coherence. It could also help identify likely pain points, where a program is at risk of clashing with existing parts of the system. In all cases, the framework provides the narrative outline for an evaluation of a program's coherence with the education system it seeks to change.

Learning trajectories, the ALIGNS principles, and the RISE systems framework each stand on their own as methods of education systems analysis. They are not sequential, but they are complementary and can be used separately or together in a multipronged effort to analyze and inform action in an education system. What they share is a commitment to concretize systems thinking and bring insights to bear on the design and evaluation of programs intended to improve learning.

References

Angrist, Noam, Andreas de Barros, Radhika Bhula, Shiraz Chakera, Chris Cummiskey, Joseph DeStefano, John Floretta, Michelle Kaffenberger, Benjamin Piper, and Jonathan Stern. "Building Back Better to Avert a Learning Catastrophe: Estimating Learning Loss from Covid-19 School Shutdowns in Africa and Facilitating Short-Term and Long-Term Learning Recovery." *International Journal of Educational Development* 84: 102397. https://doi.org/10.1016/j.ijedudev.2021.102397.

Ardington, Cally. 2021. "Midline II Impact Evaluation of Funda Wande Coaching Intervention Midline Findings." https://fundawande.org/img/cms/news/IMPACT%20EVALUATION%20OF%20FUNDA%20WANDE%20COACHING%20INTERVENTION%20MIDLINE2_v3.pdf.

Ardington, Cally, and Junita Henry. 2021. "Funda Wande Limpopo Evaluation Midline Report." https://fundawande.org/img/cms/news/Limpopo%20TA%20Evaluation%202021.pdf.

Attuhurra and Kaffenberger 2020. System (In)Coherence: Quantifying the Alignment of Primary Education Curriculum Standards, Examinations, and Instruction in Two East African Countries. RISE Working Paper Series. 20/057. https://doi.org/10.35489/BSG-RISE-WP_2020/057

Banerji and Chavan, 2016. Improving literacy and math instruction at scale in India's primary schools: The case of Pratham's Read India program. J Educ Change 17, 453–475 (2016). https://doi.org/10.1007/s10833-016-9285-5

Beatty, Amanda, Emilie Berkhout, Luhur Bima, Menno Pradhan, and Daniel Suryadarma. 2021. "Schooling Progress, Learning Reversal: Indonesia's Learning Profiles between 2000 and 2014." *International Journal of Educational Development* 85 (September): 102436. https://doi.org/10.1016/j.ijedudev.2021.102436.

Belafi, Carmen, Yue-Yi Hwa, and Michelle Kaffenberger. 2020. "Building on Solid Foundations: Prioritising Universal, Early, Conceptual and Procedural Mastery of Foundational Skills." *RISE Programme*, RISE Insight Series, 2020/021. https://doi.org/10.35489/BSG-RISE-RI_2020/021.

Crouch, Luis, Michelle Kaffenberger, and Laura Savage. 2021. "Using Learning Profiles to Inform Education Priorities: An Editors' Overview of the Special Issue." *International Journal of Educational Development* 86 (October): 102477. https://doi.org/10.1016/j.ijedudev.2021.102477.

Crouch, Luis. 2020. "Systems Implications for Core Instructional Support Lessons from Sobral (Brazil), Puebla (Mexico), and Kenya." https://riseprogramme.org/publications/systems-implications-core-instructional-support-lessons-sobral-brazil-puebla-mexico.

Evans, David K., and Anna Popova. 2016. "What Really Works to Improve Learning in Developing Countries? An Analysis of Divergent Findings in Systematic Reviews." *The World Bank Research Observer* 31 (2): 242–270. https://doi.org/10.1093/wbro/lkw004.

Evans, Norma, and Alejandra M. Sorto. 2021. "Desk Review Bala Wande Grade 1 Teacher Guide and Learner Activity Book." https://fundawande.org/img/cms/news/Funda%20Wande_Maths%20Report.pdf.

Faul, Moira V., and Laura Savage. Forthcoming. *Systems Approaches in Education*. Edward Elgar Publishing Ltd.

Funda Wande. 2019. "Funda Wande Annual Report 2019." https://fundawande.org/img/cms/news/FW%202019%20Annual%20Report_1.pdf.

Gordon, R., L. Marston, P. Rose, and A. Zubairi. 2019. "12 Years of Quality Education for All Girls: A Commonwealth Perspective." REAL Centre. University of Cambridge. https://doi.org/10.5281/zenodo.2542579.

Gove, Amber and Anna Wetterberg. 2011. *The Early Grade Reading Assessment: Applications and Interventions to Improve Basic Literacy*. RTI Press: Research Triangle Park. https://doi.org/10.3768/rtipress.2011.bk.0007.1109.

Hwa, Yue-Yi, Michelle Kaffenberger, and Jason Silberstein. 2020. "Aligning Levels of Instruction with Goals and the Needs of Students (ALIGNS): Varied Approaches, Common Principles." *RISE Programme*, RISE Insight Series, 2020/022. https://doi.org/10.35489/BSG-RISE-RI_2020/022.

Hwa, Yue-Yi, and Lant Pritchett. 2021. "Teacher Careers in Education Systems That Are Coherent for Learning: Choose and Curate Toward Commitment to Capable and Committed Teachers (5Cs)." https://riseprogramme.org/publications/teacher-careers-education-systems-are-coherent-learning-choose-and-curate-toward.

Kaffenberger, Michelle, Luis Crouch, and Laura Savage (eds.) (2021) "Schooling Without Learning: Implications of Learning Profiles for the Global Learning Crisis." [Special Issue] *International Journal of Educational Development*.

Kaffenberger, Michelle, and Lant Pritchett. 2020. "Aiming Higher: Learning Profiles and Gender Equality in 10 Low- and Middle-Income Countries." *International Journal of Educational Development* 79 (November): 102272. https://doi.org/10.1016/j.ijedudev.2020.102272.

Kaffenberger, Michelle, and Lant Pritchett. 2021. "A Structured Model of the Dynamics of Student Learning in Developing Countries, with Applications to Policy." *International Journal of Educational Development.* 82: 102371. https://doi.org/10.1016/j.ijedudev.2021.102371.

Kaffenberger, Michelle, Danielle Sobol, and Deborah Spindelman. 2021. "The Role of Low Learning in Driving Dropout: A Longitudinal Mixed Methods Study in Four Countries." *RISE Programme*, RISE Working Paper Series, 21/070. https://doi.org/10.35489/BSG-RISE-WP_2021/070.

Kaffenberger, Michelle, and Marla Spivack. 2022. "System Coherence for Learning: Applications of the RISE Education Systems Framework," RISE Working Paper Series 22/086, January. https://doi.org/10.35489/BSG-RISEWP_2022/086.

Le Nestour, Alexis, Laura Moscoviz, and Justin Sandefur. 2022. "The Long-Run Decline of Education Quality in the Developing World." Washington, DC: Center for Global Development, Working Paper 608. https://www.cgdev.org/publication/long-run-decline-education-quality-developing-world.

Loureiro, A., and L. Cruz. 2020. *Achieving World-Class Education in Adverse Socioeconomic Conditions: The Case of Sobral in Brazil*. Washington, DC: World Bank.

Mason, Pamela A., and Catherine E. Snow. 2021. "Funda Wande Language and Literacy Program." https://fundawande.org/img/cms/news/Harvard%20Report_1.pdf.

Mbiti, Isaac, and Daniel Rodriguez-Segura. Forthcoming. "Evaluating Curriculum Reforms in Developing Countries: Evidence from Tanzania." RISE Working Paper Series.

Mbiti, Isaac, Karthik Muralidharan, Mauricio Romero, Youdi Schipper, Constantine Manda, and Rakesh Rajani. 2019. "Inputs, Incentives, and Complementarities in Education: Experimental Evidence from Tanzania." *The Quarterly Journal of Economics* 134 (3): 1627–1673. https://doi.org/10.1093/qje/qjz010.

Ministry of Education, Science and Technology, Tanzania. 2016. Curriculum for Basic Education Standard I and II.

Muralidharan, Karthik. 2019. "Improving Schooling Productivity through Computer-Aided Personalization: Experimental Evidence from Rajasthan." RISE Programme Conference presentation.

Muralidharan, Karthik, and Abhijeet Singh. Forthcoming. "Improving Schooling Productivity through Computer-Aided Personalization: Experimental Evidence from Rajasthan." RISE Working Paper.

Piper, B., J. DeStefano, E. M. Kinyanjui, and S. Ong'ele. 2018. Scaling up successfully: Lessons from Kenya's Tusome national literacy program. *Journal of Educational Change*, 19: 293–321.

Popova, A., Evans, D. K., Breeding, M. E., & Arancibia, V. (2021). Teacher Professional Development around the World: The Gap between Evidence and Practice. The World Bank Research Observer. https://doi.org/10.1093/wbro/lkab006

Pritchett, Lant. 2013. The Rebirth of Education: Schooling Ain't Learning. Center for Global Development.

Pritchett, Lant. 2015. "Creating Education Systems Coherent for Learning Outcomes." *RISE Programme*, RISE Working Paper Series 15/005. https://doi.org/10.35489/BSG-RISE-WP_2015/005.

Pritchett, Lant, and Amanda Beatty. 2012. "The Negative Consequences of Overambitious Curricula in Developing Countries" Washington, DC: Center for Global Development, Working Paper 293. https://www.cgdev.org/publication/negative-consequences-overambitious-curricula-developing-countries-working-paper-293.

Pritchett, Lant, and Justin Sandefur. 2020. “Girls’ Schooling and Women’s Literacy: Schooling Targets Alone Won’t Reach Learning Goals.” *International Journal of Educational Development* 78 (October): 102242. https://doi.org/10.1016/j.ijedudev.2020.102242.

Pritchett, Lant, and Martina Viarengo. 2021. “Learning Outcomes in Developing Countries: Four Hard Lessons from PISA-D.” *RISE Programme*, RISE Working Paper Series, 21/069. https://doi.org/10.35489/BSG-RISE-WP_2021/069.

RTI, 2021. “Learning at Scale: Interim Report.” Research Triangle Park, NC: RTI International. https://ierc-publicfiles.s3.amazonaws.com/public/resources/Learning%20at%20Scale%20Interim%20Report%20-%20Final%20Draft.pdf

Samji, Salimah, and Mansi Kapoor. 2021. “Funda Wande Through the Lens of PDIA: Showcasing a Flexible and Iterative Learning Approach to Improving Educational Outcomes.” https://riseprogramme.org/publications/funda-wande-through-lens-pdia-showcasing-flexible-and-iterative-learning-approach.

Save Our Future. 2020. “Averting an Education Catastrophe for the World’s Children.” https://saveourfuture.world/wp-content/uploads/2020/10/Averting-an-Education-Catastrophe-for-the-Worlds-Children_SOF_White-Paper.pdf.

Spaull, Nic. 2015. “Accountability and Capacity in South African Education.” *Education as Change* 19 (3): 113–42. https://doi.org/10.1080/16823206.2015.1056199.

Spaull, Nicholas, and Janeli Kotze. 2015. “Starting Behind and Staying Behind in South Africa: The Case of Insurmountable Learning Deficits in Mathematics.” *International Journal of Educational Development* 41 (March): 13–24. https://doi.org/10.1016/j.ijedudev.2015.01.002.

Spaull, Nic. 2021. “Advocacy for Foundational Literacy & Numeracy: Why Do We Need It? How Do We Do It?” Presented at the RISE Community of Practice Workshop: Advocacy for Foundational Learning, November 10.

Spivack, Marla. 2021. “Applying Systems Thinking to Education: The RISE Systems Framework.” https://riseprogramme.org/publications/applying-systems-thinking-education-rise-systems-framework.

Taylor, Nick. 2021. “Evaluation of the Advanced Certificate in Foundation Phase Literacy Teaching.” Rhodes University. June. https://fundawande.org/img/cms/news/Rhodes_Evaluation%20of%20the%20Advanced%20Certificate%20in%20Foundation%20Phase%20Literacy%20Teaching.pdf.

UNESCO, UNICEF, and World Bank. 2021. *The State of the Global Education Crisis: A Path to Recovery* (A joint UNESCO, UNICEF, and World Bank report). UNESCO, UNICEF, and World Bank.

UNICEF. 2020. “Toward Achieving Inclusive and Equitable Quality Education for All: A Manual for Statistical Data Analysis Using Multiple Indicator Cluster Surveys (MICS6).” https://data.unicef.org/resources/mics-education-analysis-for-global-learning-and-equity/.

World Bank. 2003. World Development Report 2004 : Making Services Work for Poor People. World Bank. https://openknowledge.worldbank.org/handle/10986/5986

World Bank. 2018. “Learning to Realize Education’s Promise.” Washington, DC: World Bank. https://www.worldbank.org/en/publication/wdr2018.

World Bank. 2019. “Ending Learning Poverty: What Will It Take?” Washington, DC: World Bank. https://doi.org/10.1596/32553.

2030 Reading Panel. 2022. “The Inaugural 2030 Reading Panel, Chaired by Dr Phumzile Mlambo-Ngcuka, Calls for ‘Fundamental Reforms’ to Ensure That All Children Read for Meaning by Age 10 by 2030. Currently 78% of Children Cannot Read for Meaning.” https://www.readingpanel.co.za/_files/ugd/e4cf67_b9dbf878023a4445a0a554c26b8cb964.pdf.