

### **INSIGHTS**

## Measuring, Visualising, and Simulating Solutions to the Learning Crisis: New Evidence from Learning Profiles in 18 Countries

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#### Introduction

Learning profiles have the potential to change how people think about learning. Part of their power comes from their simplicity: learning profiles are line graphs tracing out how much children know and which skills they acquire over time in a particular context. However, analysed in the right way, learning profiles can help us answer urgent questions about the learning crisis and what will—and will not—redress it. How much do children learn each year in school? When do they begin to fall behind? If every child finished lower secondary school, how much more would they learn? What if girls received just as much schooling as boys and learned just as much during their years in school? These are the kinds of questions that learning profiles can answer, as demonstrated below.

In recent years, research from across RISE has analysed learning profiles in more than 50 countries based on assessments of more than 6 million individuals.<sup>1</sup> This Insight applies many of the methods pioneered in this literature and tests its most important conclusions against a vast new dataset: MICS6.

The sixth round of UNICEF's Multiple Indicator Cluster Surveys (MICS6) is exciting for a few reasons. It is the first round of the survey to measure the foundational literacy and numeracy skills of children, and it has been specifically designed to align with SDG 4.1.1. It samples

#### Key Points

- This essay analyses learning profiles of foundational literacy and numeracy using MICS6 survey data from 18 countries.
- Learning profiles reflect the depth of the learning crisis in many countries. However, there is enormous variation in learning between countries, and these differences emerge early and grow over time. Some countries—even at lower levels of development—have been able to create systems that impart foundational skills to most students.
- Simulations show that increasing enrolment and attainment would not, on their own, address the learning crisis in most countries. Where children learn little each year in school, spending more time there will not improve learning by very much.
- Simulations show that closing in-country gaps between advantaged and disadvantaged groups—such as between boys and girls would also address a relatively small piece of the learning crisis. Overall levels of learning are low for everyone, including for more advantaged groups, in many countries.
- Low-performing countries need to make systemwide changes that produce more learning per year in school for all children: prioritise foundational skills; intervene early; and don't rely on an access or equity agenda to increase learning.

<sup>&</sup>lt;sup>1</sup> This includes a special issue of the International Journal of Educational Development titled "Schooling Without Learning: Implications of Learning Profiles for the Global Learning Crisis" edited by Michelle Kaffenberger, Laura Savage, and Luis Crouch.

children ages 7-14, allowing us to directly observe how children's foundational skills change over time from the early years of primary through lower secondary school. It is a household survey, meaning that it covers both children who are in school and those who have dropped out or never attended. It also allows for comparisons between a large number of countries: as shown in Figure 1, over 60 countries or regions are expected to eventually release data from MICS6 between 2017-2022, including many geographies not previously studied using learning profiles.



Figure 1: Countries and regions that will eventually release data from MICS6

For all these reasons, MICS6 provides information beyond what is found in typical cross-sectional national, regional, and international assessments (Kaffenberger, 2019), making it is a promising dataset for creating and analysing learning profiles. This Insight is based on learning profiles constructed from publicly available MICS6 surveys from 18 countries or regions<sup>2</sup>, which collectively assessed about 120,000 children. So, what can we learn from MICS6 learning profiles?

#### Learning profiles reflect the depth of the learning crisis in many countries, and the need to prioritise foundational skills

The learning profiles in Figures 2 and 3 show how children gain foundational literacy and numeracy skills as they progress through school. To arrive at these figures, I constructed thresholds for "literate" or "numerate" following UNICEF definitions calibrated to SDG 4.1.1 (UNICEF, 2020). A child is literate if they can read 90 percent of the words in a simple 70-80 word story (i.e., "Musa is in class two."), and then answer 5 questions about the story (i.e., "What class is Musa in?"). A child is numerate if they can answer 21 simple questions that ask them to identify numbers, determine which of two numbers is larger, perform basic 1- and 2-digit addition (i.e., 12+24 as a difficult example), and recognise number patterns (i.e., 2, 4, 6, \_ ).

On one hand, these are low-bar thresholds in that they test only foundational skills, things that every child should be able to do. On the other hand, these thresholds leave little room for error—a child who can only read 85 percent of

Source: UNICEF (2020)

<sup>&</sup>lt;sup>2</sup> At the time of publication, MICS6 datasets from 34 countries or subnational regions were publicly available, but only 18 are included here. 8 more countries will be incorporated later (Guinea Bissau, Kosovo, Lesotho, Madagascar, North Macedonia, Tonga, Turkmenistan, Zimbabwe), but were excluded here due to peculiarities in the raw survey data associated with countries allowing children to take the literacy and numeracy tests in multiple languages (whereas, in other countries, the tests were only administered once in either the language of instruction or the language spoken at home). The other 8 countries did not include the foundational skills module in their national survey and so the relevant data are not available (Algeria, Costa Rica, Cuba, Georgia, Iraq, Laos, Montenegro, Serbia).

words correctly or who gets one math question wrong fails the test (further work is needed to check the sensitivity of the threshold). These thresholds are best thought of as measuring whether a child has *mastery* of foundational skills.



Figure 2: Learning profiles of foundational literacy in 18 countries show that learning is low, but varies widely

Source: Author's calculations with UNICEF MICS6 data Note: Some country profiles stop before Grade 9 where there were too few observations

Figure 3: Learning profiles of foundational numeracy in 18 countries also show that learning is low, but varies widely



Source: Author's calculations with UNICEF MICS6 data Note: Some country profiles stop before Grade 9 where there were too few observations

There are two striking features of these graphs. The first is that many of the learning profiles are relatively flat. In these countries, most students are not learning enough each year to gain low-bar foundational skills and meet SDG 4. There are only four countries in which more than half of children are meeting the SDG goals of foundational literacy by the end of Grade 3 (their highest grade attended is Grade 4), and only three countries where half of the children are numerate

by the end of Grade 3. Moreover, these descriptive learning profiles likely overestimate the causal relationship between schooling and learning since they exclude children who never attended school and are probably biased upward in higher grades where many lower-performing children have dropped out.<sup>3</sup>

Second, there is astonishing variation in learning between countries. Among students who have finished primary school (their highest grade attended is 7), literacy varies from over 80 percent in high-performing countries like Bangladesh to less than 20 percent in low-performing countries like the DRC. There is a dire learning crisis in many countries—but other countries at a similar level of development have successfully created education systems that impart foundational skills to most children. The challenge that low-performing countries face is not impossible, but they need to prioritise foundational literacy and numeracy and reorient their education systems to deliver them (Belafi, Hwa, and Kaffenberger, 2020).

# Learning profiles show when children fall behind, and highlight the need for early intervention

Where most assessments measure learning at one point in time, and often late in the schooling cycle, learning profiles show the process of learning as children progress through school. From Figures 4 and 5, it is clear that differences between countries emerge in the early years of school. While children in the three example countries have relatively similar mastery of foundational skills in the early grades, big gaps quickly open up between them and grow over time.

Figure 4: Learning profiles of foundational literacy in 18 countries show that differences emerge early, and grow over time



*Source: Author's calculations with UNICEF MICS6 data Note: Some country profiles stop before Grade 9 where there were too few observations* 

<sup>&</sup>lt;sup>3</sup> Each "highest grade attended" bucket on the x-axis includes children who are still in school, and children who dropped out after attending some or all of that grade. For example, if a 14-year-old (the oldest in our sample) attended some of Grade 1 and then dropped out, their test results would be included in the Grade 1 bucket. The learning profile is therefore descriptive: it shows what kids who attended a particular grade know and can do. It is not causal because kids who dropout (or never attend school in the first place) are not reflected in subsequent grades. If lower-performing children are more likely to never attend school or dropout, then the descriptive learning profile is biased upward (particularly in later grades, where only stronger students are still in school). See (Kaffenberger, 2019) for a longer discussion of the difference between descriptive and causal learning profiles.



Figure 5: Learning profiles of foundational numeracy in 18 countries also show that differences emerge early, and grow over time

Source: Author's calculations with UNICEF MICS6 data Note: Some country profiles stop before Grade 9 where there were too few observations

This pattern illustrates the cumulative nature of learning and the importance of closing learning gaps early on. It is more effective to intervene in earlier grades since the benefits compound over time (Kaffenberger, 2020; Das, Daniels, and Andrabi, 2020) and this can set a country (or individual child) on a steeper overall path: you can't fix Grade 9 in Grade 8 (Chiplunkar, Dhar, and Nagesh, 2020).

This same pattern—of learning gaps emerging early and persisting through school—also holds true within countries and even inside classrooms. The bubble chart in Figure 6 provides a rough picture of the distribution of student learning levels within each grade. It groups students by the percentage of words they read correctly in the MICS6 story, and averages across all 18 countries in the data.





Source: Author's calculations with UNICEF MICS6 data

Two points jump out from this graph. First, the data reflect a large literature on the wide spread in student learning levels within each grade (Muralidharan, Singh, and Ganimian, 2019), and this variation is present from Grade 1.<sup>4</sup> Second, this pattern persists through Grade 9, meaning that there are a significant number of children in later grades that still cannot read a meaningful percentage of a Grade 2-3 level story. Once children fall behind, many remain in school and learn little, or drop out altogether. This points to the importance of aligning the level of instruction with children's learning levels (Hwa, Kaffenberger, and Silberstein 2020) either by reorienting curricula to match the rate at which children learn (Kaffenberger and Pritchett, 2021) or through changes to other instructional components (i.e., teaching and learning materials, pedagogy, and assessments).

#### Learning profiles show that an access agenda will not, on its own, address the learning crisis in most countries

Learning profiles can also be used to simulate the potential impact on learning of many common education reform agendas being pursued today. For instance, because learning profiles link schooling and learning, they are well-suited to asking how much an access and attainment agenda could be expected to deliver in terms of additional learning. To investigate this question across the range of countries in the data, I selected four example countries that are all low or lower-middle income and which represent the four possible cases defined by Table 1 below.

	Flat Learning Profile	Steep(er) Learning Profile
Low Baseline Enrolment	The Democratic Republic of the Congo	Sierra Leone
High Baseline Enrolment	Ghana	Bangladesh

Table 1: Differences between countries shape the expected outcome of an access agenda on learning

Following the methodology used by other RISE researchers—applied previously to Demographic and Health Survey data (Pritchett and Sandefur, 2020) and Financial Inclusion Insights data (Kaffenberger and Pritchett, 2020)—it is then possible to simulate how much more we could expect kids to learn if they all stayed in school until age 13 or 14. In other words, what if all kids who never went to school, or who dropped out, instead stayed in school and learned as much as the in-school kids their age do right now? This counterfactual approximates the push for universal lower-secondary school that is currently underway in many countries.

In Figure 7, the gains to foundational literacy from this agenda are represented by going from the blue to the orange bar. This is almost certainly an overestimate since it assumes out-of-school children would perform as well as those in school—when they usually perform significantly worse (Kaffenberger, Sobol, and Spindelman, 2021)—and also assumes that education systems have the capacity to expand at constant quality.

It is also possible to contrast the potential impact of an access agenda with that of a learning agenda. What if each kid spent exactly as many years in school as they do now, but they learned more each year, as much as kids in Bangladesh do (in other words, each country maintained its current attainment profile but had the learning profile of Bangladesh)? The choice of Bangladesh is arbitrary, but it makes sense as an aspirational-yet-realistic target. Bangladesh achieves the highest literacy in Grade 9 of any LMIC in the dataset, but is not an outlier in terms of GDP or expenditure on education. The plausible impact of this learning agenda is represented by the grey bars in Figure 7.

<sup>&</sup>lt;sup>4</sup> The bi-modal nature of the distribution of learning within each grade is partly an artifact of the data. At the low end of the distribution, this is partly due to survey design. MICS6 used an easy practice exercise to screen out many children from taking the actual literacy assessment, and they are all assigned a score of zero. At the high end of the distribution, the assessment is pegged to a Grade 2-3 level (following SDG 4.1.1), so it top codes very quickly. The spread of student learning levels would be wider at the top if measured against a more difficult (i.e., grade appropriate) skill in the higher grades.





Source: Author's calculations using UNICEF MICS6 data

This simulation reveals the limits of an access agenda. The gains would be very modest in countries where most kids are already in school (Bangladesh, Ghana), or where being in school doesn't teach you that much (DRC). For the average country in the dataset, universal lower secondary might increase learning by around 5 percentage points, or a little less than 1/10 of the gap to universal foundational literacy (SDG 4.1.1.). Going to and staying in school still leaves most countries a long way from achieving learning goals. Sierra Leone represents the asterisk to this conclusion. In Sierra Leone, an access agenda might yield more learning since there are many kids out of school, and the learning profile for those in school is relatively steep. This variation among the example countries underscores the need to build and analyse learning profiles at the country (or subnational) level.

If countries instead prioritised a realistic learning agenda, and were able to transform their education systems to deliver as much learning per year as Bangladesh, they could expect much larger learning gains. Foundational literacy would double in Ghana, quintuple in the DRC, and would on average close nearly 40 percent of the gap to SDG 4.1.1 across all 18 countries. In the average country, a learning agenda yields 4 times the gains of an access agenda.

While this analysis has focused on literacy, the same conclusions also hold qualitatively for numeracy, although the magnitudes are smaller. In summary, while some countries would benefit more than others from expanding access— and there is a real need for country-specific analysis—following the 'business as usual' approach to reform by expanding access to schooling will usually not be sufficient to close the yawning gap between current learning levels and the SDGs.

#### Learning profiles show that greater equality within countries will not, on its own, be enough to address the learning crisis either

Learning profiles are also a useful tool to simulate the consequences of another common education reform agenda: equity and inclusion. The equity and inclusion agenda is often focused on closing in-country gaps between groups, especially those associated with gender, wealth, and urban versus rural geography.

Let's start with gender. Figure 8 disaggregates learning profiles by gender.



Figure 8: Achieving gender equality within countries would still leave most children far short of learning goals

Source: Author's calculations using UNICEF MICS6 data

On average, boys (solid lines) and girls (dotted lines) are learning the same amount as they move through school (and girls actually perform slightly higher by Grades 7-9). However, there are specific countries, such as Ghana, where this is not true and gender is more of a dividing line for who is learning.

Figure 9 zooms in on the learning differences between boys and girls. Each line represents a different country from the dataset.



Figure 9: Gender differences in learning are small in almost all countries and grades

Source: Author's calculations using UNICEF MICS6 data Sample limited to grades with >100 unweighted observations per gender

As is clear, the difference between boys and girls is relatively small in almost every country and grade. It is almost always less than .15 percentage points, and more often than not it is girls who are learning more than boys (across all countries and grades, girls have 1 percentage point higher numeracy than boys, and 3 percentage points higher literacy). There's a learning crisis for boys and girls in nearly equal measure.

Figure 10 extends the analysis to other "sources" of inequity and inclusion (Crouch, Rolleston, and Gustafsson, 2021), and benchmarks them against the large absolute gap to universal mastery (the leftmost bars). Each bar averages across the 18 countries in the dataset.



Figure 10: Inequality between groups explains a relatively small part of the learning crisis

Source: Author's calculations using UNICEF MICS6 data

Gender differences are, on average, the least significant dimension of inequity. Other dimensions of inequity, especially wealth, are more significant, but still small relative to the absolute gap to universal mastery of foundational skills. This observation also holds for overlapping or multidimensional inequity: rich, urban boys learn more than poor, rural girls, but even the triply advantaged are far away, in absolute terms, from basic literacy and numeracy.



Figure 11: What if the disadvantaged (poor, rural girls) were equal to the advantaged (rich, urban boys)?

Source: Author's calculations using UNICEF MICS6 data

As in Part 3 above, we can again use learning profiles to simulate the gains to learning from pursuing a particular reform agenda, in this case an equity agenda. Following the methodology from previous RISE work that ran similar simulations using data from citizen-led assessments (Akmal and Pritchett, 2021), Figure 11 shows the expected impact of three different equity agendas: ensuring the disadvantaged and advantaged stay in school for the same number of years (orange bar); ensuring the disadvantaged learn as much as the advantaged each year they spend in school (grey); and equalising both the years in school and the amount learned per year between both groups (yellow).

Equalising access to schooling between the advantaged and disadvantaged would do little for literacy in the average country (2 percentage points difference). Equalising the learning profile would do more, particularly in countries where there is greater inequality (i.e., Ghana). However, even achieving full parity between rich, urban boys and poor, rural girls would close only 30 percent of the gap to universal literacy in the average country, leaving more than 45 percent of kids still unable to read a basic story and understand it. If countries eliminated the overlapping inequalities in learning associated with gender, wealth, and geography, far too many children would still not reach the low-bar SDG targets for foundational skills.

Achieving in-country equality doesn't help that much because even the advantaged are not doing that well (Pritchett and Viarengo, 2021). Learning is low across entire education systems. This points to the need to focus on *absolute* rather than *relative* outcomes (Newman, 2021), and prioritise changes that shift the entire education system toward producing more learning (Spivack, 2020) for the advantaged and disadvantaged alike.

#### What's next for learning profiles?

As RISE enters its final years, parts of our network have begun working with external partners to institutionalise the use of learning profiles and related tools (Kaffenberger and Pritchett, 2021). These partnerships are developing tools and trainings to enable practitioners and policymakers to understand learning profiles, explore related RISE messages, and apply them to their own contexts. If they are widely adopted, learning profiles can be a powerful catalyst to shift the conventional wisdom around global education reform and move toward a new set of principles for tackling the learning crisis.

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