United Nations
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GLOBAL ALLIANCE TO MONITOR LEARNING

SUSTAINABLE DEVELOPMENT GOALS

Projecting attainment of SDG 4.1.1

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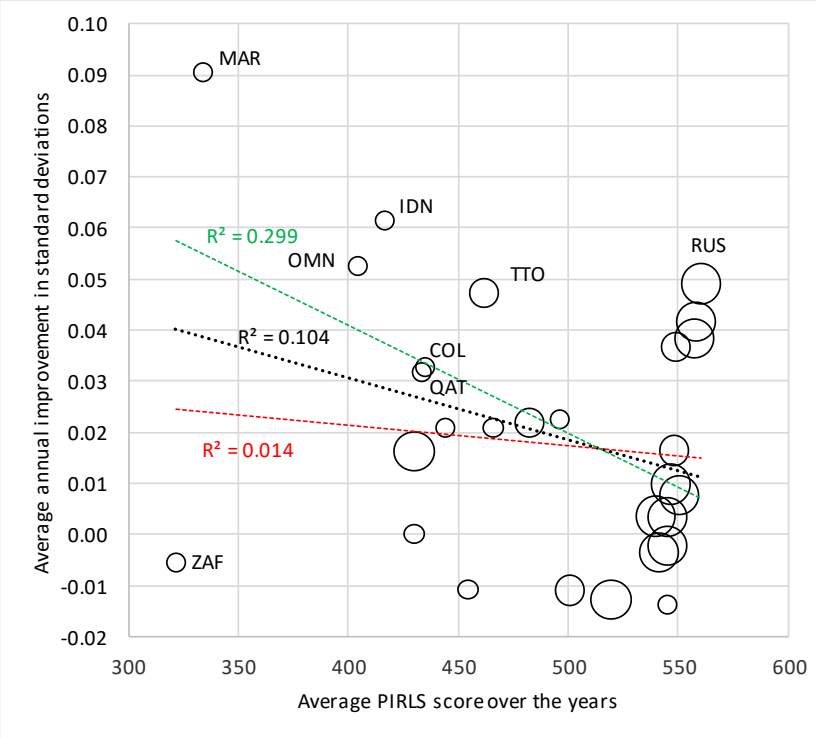
This report provides an update on work commissioned by the UIS on SDG 4.1.1 projections[1], to be completed by the end of September 2019. **Two reports** are the outcome, the first dealing with trends seen in the international testing programmes in recent years, the second with projections. The second report is accompanied by an Excel projection tool. The aim is to inform global and national target-setting, and the broader discussion on educational development.

How fast can education systems be expected to improve? As the projection tool uses the mean scores of countries as an input, and as most of the debate around improvements has so far focussed on means, this question is dealt with in part with respect to means. Figure 1 confirms what some existing analysis has already pointed to (similar analyses are being done on the results of programmes other than PIRLS). Annual improvements are illustrated in terms of the change in the mean relative to the standard deviation in the base year, a common practice. It is a practice which can be problematic, for instance because developing countries tend to display larger standard deviations. Yet the approach seems sufficient for the current analysis. The various trendlines in the graph depend on how certain anomalies in the statistics are interpreted. Even a relatively rigorous programme such as PIRLS displays anomalies, for instance in terms of suspiciously large annual increases or decreases.

Figure 1: PIRLS improvements in terms of standard deviations



Note: The three sizes of the markers represent (from smallest) two, three and four years of data in the series.

PIRLS is far from representative of the world. For instance, only 7% of the Latin America and Caribbean region and 4% of the Sub-Saharan Africa region are covered. Countries participating in programmes such

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as PIRLS are likely to prioritise education strongly and thus be better improvers. The business-as-usual (BAU) trend seen in PIRLS, with respect to lower primary reading, is thus considered **an *optimistic* BAU scenario**. In this scenario, developing countries with low baselines such as Morocco and South Africa are assumed to progress by 0.04 standard deviations a year, while a country with Russia's high level of performance advances at 0.01 standard deviations a year. It is also useful to consider a 'speed limit', or the very fastest improvements seen the past, which are also believable and not obviously a result of measurement error. One can think of this 'speed limit' lying at 0.07 standard deviations a year for countries such as Morocco and South Africa, and 0.04 for Russia. Clearly, it is the assumptions made for developing countries which matter most, as developed countries are left with relatively few non-proficient children.

Turning to the projections of the percentage of children in various age groups reaching minimum levels of proficiency, much can be learnt from comparing the issues to those seen in three other areas, namely enrolments, poverty eradication and emissions. The trajectory for proficiency is arguably more difficult to model currently than that for any of the three other indicators. Firstly, knowledge about country-specific and global trends in the past is still very limited, in part because the existing data cover only a part of the globe, and probably that part most likely to see progress. Secondly, **the factors influencing change**, in particular at the level of whole countries, as opposed to groups of schools subjected to 'experiments', are poorly understood. All this limits what can be said about the likely future of proficiency. Yet there is scope for a far better knowledge base to be created. Distributions of learning outcomes are not inherently more difficult to measure than distributions of income. Monitoring systems, for example regional programmes such as SACMEQ and PASEC, need to be strengthened, and more countries need to participate in them.

Reported trends for learning outcomes can have large political impacts, and these impacts can be undesirable if trends are inaccurate. **Projections are also politically sensitive.** Educational quality is a widely debated matter, and is often a prominent political goal. Projections pointing to slow progress – and the progress illustrated below is rather slow – are likely to clash with what people would want to see in the future. In contrast, projections dealing with enrolments, where progress is easier, are likely to be more widely accepted.

Given the political sensitivity of proficiency, lessons from the area of emissions monitoring can be useful. In this area, the challenge of clarifying the reliability of reported trends is in part dealt with through **a systematic process of reviews by international teams of experts**, who evaluate each country's adherence to global monitoring standards, standards which explicitly take into account the fact that the systems of different countries are at different levels of maturity. Obviously, learning outcomes do not have the international spillover effects of emissions, yet similar quality assurance approaches could help to build technical capacity, and ensure that policies are premised on realistic information on what is possible.

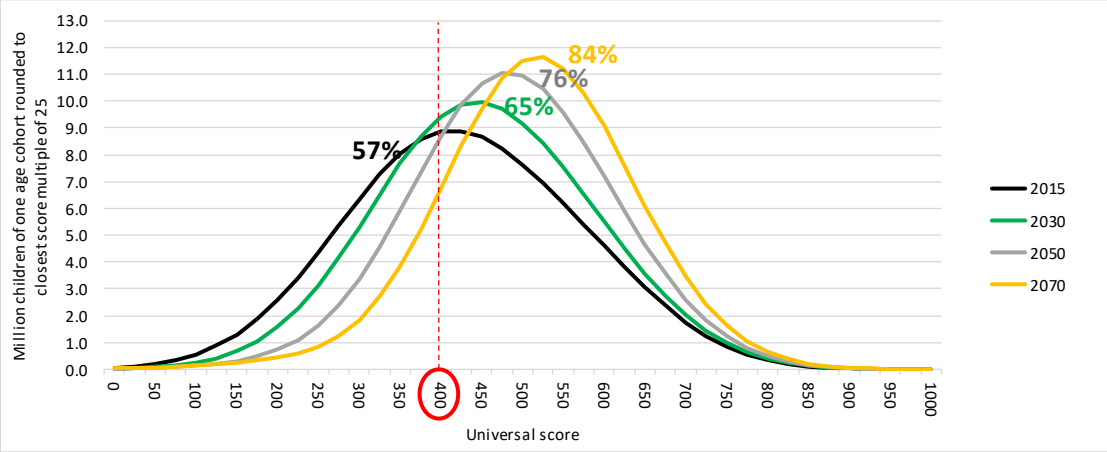
Turning to the projection model, one thing it does *not* do is describe with much accuracy the baseline situations in all of the world's countries. The country-level data used in the tool are the outcome of adjustments which could skew the actual picture in individual countries, as well as imputations for over half of all the world's countries. The original dataset of normalised percentage proficient statistics from which the current work draws, and which was produced for the UIS in an earlier project, is problematic in places. By extension, **the tool does not set out to recommend to individual countries what their SDG 4.1.1 targets should be**. What the Excel tool *is* designed to do is to produce baselines and projections for the world, and for the seven UNESCO world regions, with a view to answering important questions. For instance, how realistic is the goal that by 2030 all the world's children will be proficient? Which categories of countries, or world regions, must be prioritised if global targets are to be met? How

do demographic trends, in particular population growth, influence global proficiency statistics? Though the tool is not specifically designed for national planners, it should still be of interest to them insofar as its methods would to a large extent be applicable even for a national model.

There are not many inputs the user of the Excel tool needs to specify to generate a scenario. A key input is the expected rate of progress, in terms of proportions of a standard deviation per year, relative to various points of departure. **Faster improvements in developing countries are in general assumed.** Moreover, the tool allows for larger standard deviations in less developed countries. Rates of progress can vary across each of the seven UNESCO world regions. The tool takes the baseline percentage proficient for each country, and constructs a normal curve that corresponds to this, and then weights this curve by the baseline population. For future years, the normal curve moves rightwards, in line with the expected improvement. Moreover, the normal curve expands or shrinks in line with the population projections. For the latter, the medium variant of the 2019 World Population Prospects is used. Nothing in the tool is hidden from the user, or locked.

Key outputs of the tool include a set of graphs describing global and regional distributions of proficiency in the base year and in future years. Figure 2 reflects the 'optimistic BAU' scenario, with standard deviations set the same, at 100, across all countries. While global curves may appear normal, this is not due to the tool's design. If one aggregates national curves (these are assumed to be normal), the result is global curves which are roughly normal. The test score scale is roughly that of TIMSS and PIRLS, and a proficiency threshold of 400 is used, in line with current thinking. Here lower primary reading is covered, though other subjects and school levels are likely to produce similar patterns. **Children considered proficient rises from 57% in 2015, to 65% in 2030**, and 84% by 2100. Making the tool predict higher standard deviations, meaning higher levels of inequality, in developing countries would change the last two figures to 68% and 87%. Even if the 'speed limit' described were met across the entire world, a scenario we can consider impossible, progress would not be fast enough to reach the 100% envisaged in SDG Goal 4.1. In such a scenario, 75% is reached in 2030, and 97% in 2100.

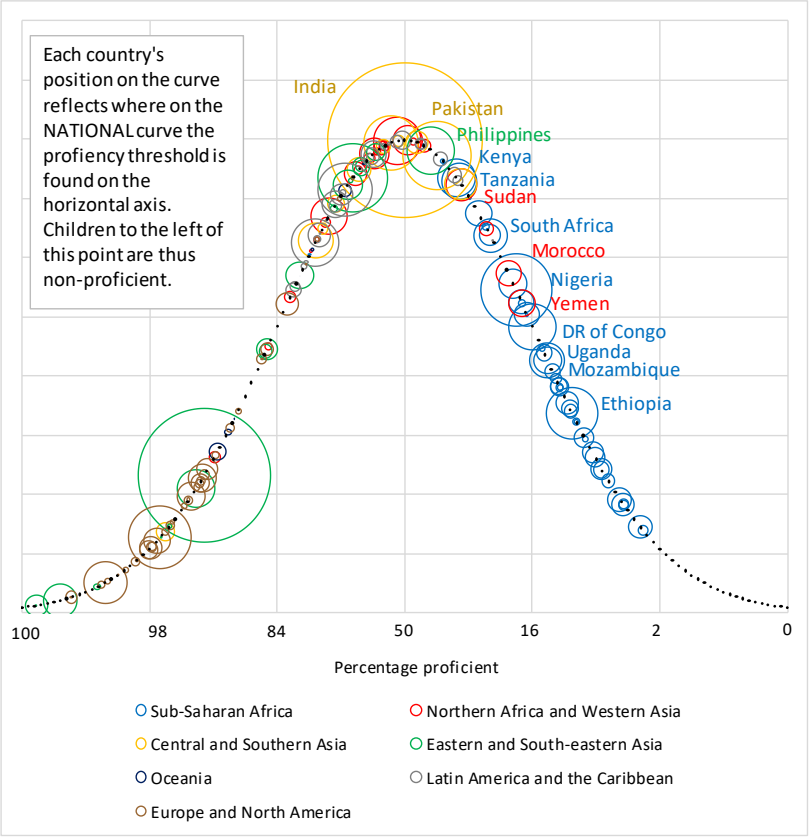
Figure 2: Four MPL-based distributions (optimistic BAU)



Countries where most children are not proficient are those countries which can expect the fastest gains in the percentage proficient, given a specific annual improvement in standard deviations per year. This is due to the normality of the typical distribution of learning outcomes. This effect occurs separately from the effect whereby the least developed countries tend to see greater annual improvements in their *mean*.

Countries where fewer than half of children are proficient, and where populations are large, are labelled in the next graph. Clearly, **concentrating on improvements in these countries is not only fair, it is also efficient in terms of improving the global indicator value**.

Figure 3: Countries with a large potential for contributing to global change



Note: Countries are represented by circles, whose area is proportional to the size of one child age cohort in 2015. The dotted line illustrates the underlying normal curve.

A key finding emerging from the scenarios is that differences across world regions in the demographic trends are large enough to influence substantially the aggregate proficiency situation. Specifically, high population growth in the region with the lowest proficiency statistics, namely Sub-Saharan Africa, poses a special challenge. Much effort will need to go towards improving educational outcomes in this region if globally a movement towards the SDG on learning proficiency is to be maintained. In what is probably an unlikely scenario, where there is no progress in any country with respect to the percentage proficient, **the global percentage would move backwards, from 57% proficient in 2015 to 53% proficient in 2030, simply as a result of demographic shifts** (again, lower primary reading is considered). In fact, a minimum degree of improvement at the country level, amounting to around 0.01 of a standard deviation a year across all countries, would be necessary simply to maintain the global figure of 57%. Improvements beyond 0.01 of a standard deviation would be required to allow the global percentage proficient figure to rise.