4 QUALITY EDUCATION

Companion Publication

Assessing Learning Proficiency Levels and Trends for Sustainable Development Goal 4.1

A focus on Africa

UNESCO

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To fulfil its mandate, UNESCO performs five principal functions: 1) prospective studies on education, science, culture and communication for tomorrow's world; 2) the advancement, transfer and sharing of knowledge through research, training and teaching activities; 3) standard-setting actions for the preparation and adoption of internal instruments and statutory recommendations; 4) expertise through technical cooperation to Member States for their development policies and projects; and 5) the exchange of specialized information.

UNESCO Institute for Statistics

The UNESCO Institute for Statistics (UIS) is the statistical office of UNESCO and is the UN depository for global statistics in the fields of education, science, technology and innovation, culture and communication. The UIS was established in 1999. It was created to improve UNESCO's statistical programme and to develop and deliver the timely, accurate and policy-relevant statistics needed in today's increasingly complex and rapidly changing social, political and economic environments.

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EXECUTIVE SUMMARY

Sustainable Development Goal (SDG) 4.1 focuses on free, equitable and quality primary and secondary education for all girls and boys. The indicator accompanying this goal requires setting a minimum proficiency level for three levels of the schooling system and two subjects, reading and mathematics, and conducting assessments to determine what proportion of children are minimally proficient. This indicator, formalized in 2017, in many ways reflects the core of the schooling process. Yet it is an exceptionally difficult indicator to implement fully.

Measures of learning proficiency, in particular in developing countries, remain scarce and their reliability often questionable, reflecting the many methodological, funding and political hurdles that stand in the way of producing comparable measures of proficiency. Still, there has been substantial progress in this area, and the very process of developing the required measurement systems has helped to bring about a stronger focus, among governments, non-government organizations and citizens, on the urgent need to improve learning proficiency as both a human right and a social development imperative.

This report examines the availability and reliability of statistics on SDG 4.1, with a focus on the Africa region, and discusses what these statistics suggest about learner proficiency both in recent years and since the start of the COVID-19 pandemic. It is aimed primarily at those with an interest in measuring proficiency and in interpreting proficiency statistics. The UNESCO Institute for Statistics (UIS), the African Union, and national government and non-government organizations across Africa are among the expected users of the report.

The report begins by examining the availability of SDG learning proficiency indicator values. For the applicable indicator 4.1.1, there is a maximum of six possible values per year and per country. Viewed against this ideal, availability remains very low everywhere: Only 7% of the possible indicator values for the period from 2014 to 2019 are available for Africa and 8% for the rest of the world. Meanwhile, 14 of 55 countries in Africa have adequate statistics from recent years to determine at least one trend over time, largely owing to the success of the francophone PASEC testing programme.

The available values point to a generally low level of learning proficiency in Africa. For instance, 29% of African lower primary learners are proficient in reading, according to the SDG 4.1.1 values, against 57% in developing countries elsewhere. Yet, in Africa and elsewhere, the available SDG 4.1.1 trend data point to steep improvements; for instance, in recent years, Africa has seen an improvement of 4.3 percentage points a year in the percentage of lower primary children proficient in reading, while an annual improvement of 3.0 percentage points has been found in developing countries outside Africa. These findings, however, raise questions around the reliability of the existing data because past analysis suggests that it is rare and exceptional for a single country to achieve an annual improvement of 3.0 percentage points over several years. Statistics that overstate these improvements may be particularly detrimental to the planning process in concerned countries.

Cross-subject correlation is an important internal consistency check: If a country's children perform well in reading, one can expect them to also perform relatively well in mathematics because factors that drive reading proficiency, such as effective schools, also drive proficiency in mathematics. Cross-subject correlations are high at the lower primary level in Africa, but not at the end-of-primary level. Again, this raises important questions around the reliability of some of the statistics. Cross-level correlations are also important. One might expect a country with a relatively high level of reading proficiency at the lower primary level to display a similarly high level at the end of primary school. However, this pattern is often broken in the case of the African indicator values. A part of the explanation may be that there are more data points for this kind of analysis in Africa than in the rest of the world as a whole. More inconsistencies in Africa may simply reflect the fact that Africa has progressed further than elsewhere when it comes to covering more than one subject, and more than one level, in the primary schooling band.

African indicator values, like those from the rest of the world, point to decreasing levels of proficiency with higher grades in the schooling system. Thus, end-of-primary proficiency emerges as worse than lower primary proficiency. These findings are in line with the notion that learners fall behind as they progress through the grades, but also that curriculum standards tend to be demanding and not to recognize this phenomenon of falling behind.

An analysis of gender-specific patterns confirms that in Africa, as in the rest of the world, girls on average perform slightly better than boys, in particular in reading. Females outperform males in a slightly greater number of African countries than the reverse, and they are shown to do so even when gender differences in school participation are taken into account.

Existing patterns in the SDG 4.1.1 indicator values in certain countries raise important questions around measurement accuracy, especially if changes over time are much larger than those generally seen around the world, and if changes by subject are not consistent. While PASEC is clearly Africa's most successful regional assessment system, it is still under development. For PASEC and other assessment programmes to develop further, patterns in the values and in the microdata must be carefully evaluated from various angles. National organizations must evaluate the assessment data and compare home background details to those seen in, for instance, household surveys, so that the available statistics can be appropriately interpreted in the national policymaking process. Examining what a wider range of data reveals about proficiency levels, the report discusses whether relevant statistics outside the SDG reporting system reveal similar patterns and what the consistencies and inconsistencies among them suggest about how to interpret different statistics. These other sources include the most recent SACMEQ results, Multiple Indicator Cluster Surveys (MICS), the World Bank-UIS's measure of learning poverty and harmonized test scores, the World Economic Forum (WEF) education quality indicators and adult literacy rates. Correlations across different series of country values are discussed, along with how the levels of proficiency vary across sources, to determine the degree of consistency across various indicators.

The report next turns to current estimates of the impact of the 2020 pandemic on proficiency. There is relative certainty around the extent of lost schooling time during the COVID-19 pandemic. By the middle of July 2021, Africa's learners had lost an estimated 69% of a school year on average. Evidence specific to Africa is emerging on what this means for learning proficiency, though far more evidence is needed. There is evidence of learning losses where learning essentially came to a halt during the pandemic, meaning learners did not progress as they should have. But there is also evidence of learners regressing and having fewer skills than they had before the pandemic began.

Information is provided on monitoring systems, drawing in part from the UIS Database of Learning Assessments. At the primary level, 50% of Africa's children are in countries where international assessment programmes have operated in the last ten years. This figure rises to 78% when sample-based national assessments are included. Both international and national assessment systems display gaps and should be undergoing a continual process of learning and improvement.

Finally, the report provides four recommendations for future monitoring. Firstly, improving measurement within existing indicator definitions must be prioritized. Africa has done relatively well in this regard, with above-average availability of SDG proficiency statistics at the primary level. The challenge is to continue to improve data collection and reporting practices. Secondly, Africa should focus on the development of the two African assessment programmes, PASEC and SACMEQ, which not only benefit participating countries but are also a vehicle for building African technical capacity. Thirdly, a sense of national ownership of SDG 4.1.1 statistics is important, including active involvement in determining when SDG proficiency statistics are of a sufficient quality for official reporting and planning purposes. Fourthly, holistic monitoring of learning must draw from all available data sources and find, through use of the underlying microdata, explanations for consistencies and inconsistencies across different datasets.

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1.Introduction

The African Union's (AU) Continental Education Strategy for Africa (CESA) recognizes the centrality of educational improvement for development:[1]

> *Africa is ushering into an era that most observers and pundits are predicting will determine its destiny as the continent of the future. But to fulfill this promised bright future, the continent has to come to terms with its education and training systems that are yet to fully shed the weight of its colonial legacy and its own tribulations as a relatively new political and economic entity and player in the world arena.*

In 2020, just before the start of the COVID-19 pandemic, approximately 250 million children in Africa in grades 1 to 8 were attending school, and around 64 million children who should have been attending these grades were out of school.[2] The impacts of the pandemic on attendance are still unclear. Yet even before the pandemic Africa faced an urgent need to school more children. However, an increase in provision must come with the realization that schooling needs to be of an adequate quality, as the ultimate aim is not to enroll children in schools, but for children to learn. CESA acknowledges these problems:

> *The African education and training systems are also characterized by low quality of teaching and learning, inequalities and exclusion at all levels.*

In Africa immediately before the pandemic, only around 24% of learners were estimated to be learning to read adequately by Grade 3, and proficiency statistics for higher levels of the schooling system are even lower..[3] The learning problem in Africa is thus at least as significant as the attendance problem.

Quality schooling, in the sense of schools where learners acquire the requisite skills, is covered within Goal 4.1 of the Sustainable Development Goals (SDGs), agreed upon through a resolution adopted in the United Nations General Assembly in September 2015. Goal 4.1 reads as follows:[4]

> *By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes*

In 2017, the following learning proficiency indicators were agreed on for the above goal:[5]

> *4.1.1 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*

Goal 4.1 is concerned with both access and quality, which implies that indicator values must be adjusted to account for out-of-school children. The current practice is to calculate indicator 4.1.1 using enrolled learners, not all children of the age corresponding to the schooling level in question, as the denominator. The desirability of having a population-based denominator has been acknowledged,[6] but given that most assessment of proficiency occurs in schools, the most practical option is to report on the proficiency of school-based learners.[7]

While access to schooling has received attention for many years and was a key focus area of the Millennium Development Goals introduced in 2000, improving the quality of schooling has become an increasingly central concern. The wider development and economic rationale, explained in, for instance, UNESCO's 2005 *Global Monitoring Report*,[8] is now widely accepted.

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[1]   African Union 2016.
[2]   Attendance number from UIS.Stat with some imputation for countries with no data. Number of out-of-school children from data behind UIS 2020, For more information consult http://gaml.uis.unesco.org/wp-content/uploads/sites/2/2020/01/SDG4-projection-tool-Gustafsson.xlsx.
[3]   Data behind UIS 2020.
[4]   United Nations 2015.
[5]   United Nations 2017.
[6]   UIS 2021a, p.6.
[7]   UNICEF 2020, p.37, SDG indicator metadata for 4.1.1 at https://unstats.un.org/sdgs/metadata.
[8]   UNESCO 2005.

The importance of having reliable measures of access to and quality of schooling is clear. Comparisons across countries help to underscore how urgently a country needs to address its access and quality challenges and which countries warrant attention as success cases. Reliable comparisons over time help governments and societies to evaluate whether existing strategies are succeeding in bringing about progress and preserving gains made in the past.

The UNESCO Institute for Statistics (UIS) has prioritized the Africa region given the serious education challenges on the continent. It has released reports focusing specifically on school resourcing in Africa,[9] while a recent report takes stock of SDG statistics on education in Africa using CESA as a framework.[10] The coverage of learning proficiency in that report is brief, and an aim of the current report is to provide more detail on this topic.

The AU has emphasized the need for an efficient and integrated approach in adopting the SDGs against the backdrop of the AU's own planning frameworks.[11] While CESA deals extensively with the need to improve learning proficiency in schools across Africa and promotes the use of reliable indicators of progress,[12] the AU has not formalized its own indicators on proficiency. The SDG indicators of learning proficiency are thus the pre-eminent international indicators on proficiency that African countries are currently working with.

The current report takes stock of and evaluates existing SDG 4.1.1 indicator values for the 55 countries of Africa.[13] Measuring learning proficiency poses formidable methodological challenges. Learning proficiency is both at the heart of the schooling process and arguably the most difficult aspect of schooling to measure. Determining reliable indicators is a developmental and learning process in which the entire world is engaged. It is a process that requires continual evaluation of the quality of existing statistics and the improvement of measurement systems. It also depends on the ongoing development of technical capacity in government planning institutions and in non-government knowledge organizations, such as universities. CESA underlines the need for 'capacity building for data collection, management, analysis, communication, and usage' in the education sector as well as the identification of and support for 'educational think tanks'.[14] The current report is intended as a tool to advance this work.

Section 2. examines official reporting against the SDG 4.1.1 indicators and explores the frequency and quality of the African statistics compared with those for the rest of the world. The internal consistency of Africa's and the world's SDG 4.1.1 indicator is also examined. Given that little of this type of consistency analysis has been undertaken up to now, a part of the challenge is to identify meaningful and transparent methods to assess the consistency of SDG 4.1.1 values across countries, subjects and school levels. Factors behind data quality, such as the maturity of assessment and data collection systems, also receive attention.

Section 3. zooms in on the reliability of trends seen in Africa's SDG 4.1.1 indicators. While much of the attention up to now has been on establishing comparable levels of proficiency across countries, it is increasingly recognized that for national planning, having reliable trend data indicating whether proficiency is improving is vital. While countries may have instruments outside of the SDG reporting system to determine whether education outcomes are improving, it is likely that SDG measures of proficiency, and the trends these measures display, will become increasingly influential in education policy debates. Given the importance of human resources in the economy and social development, proficiency trends are of obvious importance even in policy areas outside education.

Section 4. turns to the consistency between Africa's SDG 4.1.1 values and its values in other systems, focusing on proficiency and education quality. The extent to which statistics draw from enrolled learners, as opposed to age cohorts in the child population, is explored. The aim here is twofold. On the one hand, the reliability of the existing SDG 4.1.1 is assessed. On the other, the intention is to provide a more comprehensive picture of the proficiency of children in Africa, drawing from a wider selection of statistics.

Section 5. evaluates what is currently known about the impact of the COVID-19 pandemic on proficiency in Africa and discusses what new challenges the pandemic poses for the measurement of proficiency. Section 6. provides an overview of country participation in international assessment programmes and the extent to which national assessment programmes exist in Africa. Finally, Section 7. provides policy recommendations aimed at the UIS, the AU and national governments and institutions in Africa.

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[9] UIS 2012, 2016.
[10] UIS 2021b.
[11] Union 2016.
[12] African Union 2016, p.30.
[13] The 55 members of the AU in 2021.
[14] African Union 2016, p.26.

2.Official SDG 4.1.1 percentage proficient statistics

2.1. Availability of indicator values

SDG 4.1.1 indicator values as they stood in May 2021 in the online UIS.Stat system[15] were examined with the aim of assessing the completeness and internal consistency of the values for Africa in a global context. The relevant tables from the system included 241 countries and territories. Each country or territory was assigned a value from 0 to 4 depending on how available the data were, as outlined in Table 1. One key assumption of this scale is that having trend data or values from more than one point in time is better than having just one data point per education level and subject (keeping in mind that SDG 4.1.1 covers three education levels and two subjects). As the UIS.Stat tables covered the years from 2014 to 2019, only trends during these six years would be reflected. A further assumption is that having indicator values at one of the two primary levels is even more valuable than having indicator values at the lower secondary level. This notion reflects the importance of dealing with quality problems as early in the learning process as possible.

Table 1: Levels of SDG 4.1.1 status

0	No values
1	Secondary level value(s), but no trend
2	Primary level value(s), but no trend
3	Secondary trend
4	Primary trend

To illustrate the ranking, if country X has two values, for instance in 2015 and 2018, at the end-of-primary level *in the same subject*, for instance reading, then the country is given a score of 4. A country with a trend at the secondary level and also a value but no trend at the primary level is assigned a value of 3.

Figure 1: SDG 4.1.1 level of reporting from 2014 to 2019
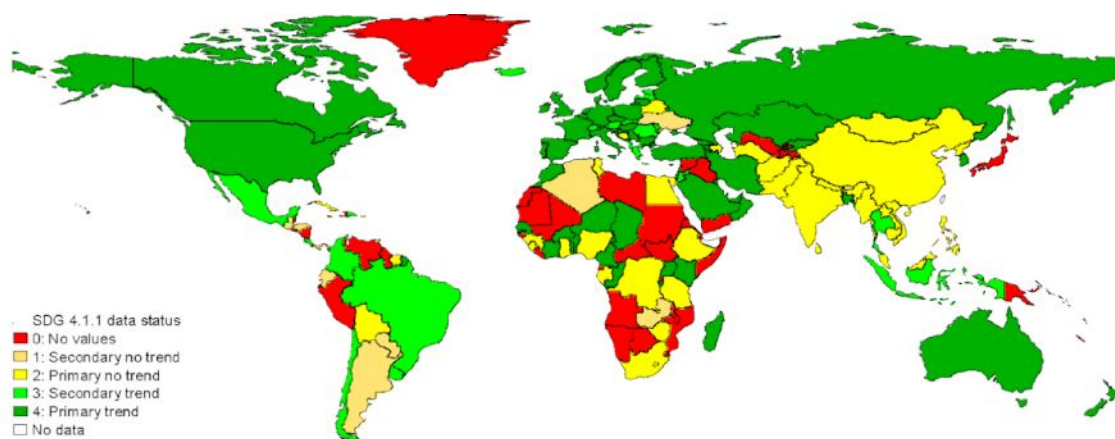
Figure 1 reflects the values of countries that are not extremely small, while the diagrammatic map[16] in Figure 2 reflects all 55 countries in Africa. The lower availability of trends in Africa is clearly visible, though a few African countries do have trend data at the primary level and thus carry the highest status. If one averages across all countries, including small ones, one obtains an average status value for Africa of 1.6, against 5.7 for the rest of the world. However, if values are weighted by each country's child population[17] – in other words, if one attempts

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[15] http://data.uis.unesco.org
[16] This 'cubic map' follows the format used in UIS (2021b)
[17] This is the population aged 0 to 14 on UIS.Stat.

to gauge what the average child experiences, not the average country – then the values are 2.1 for Africa and 2.4 for the rest of the world. Countries in Africa with larger populations tend to display a relatively good status, while outside Africa the reverse applies. The latter is true largely because China and India have no trends in the UIS.Stat tables.

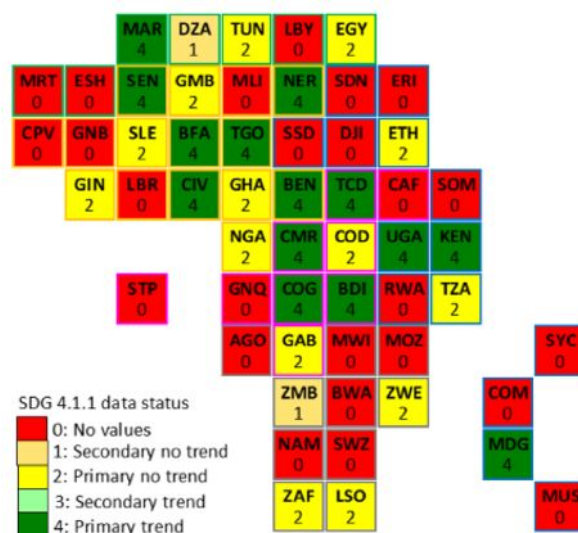**Figure 2: SDG 4.1.1 level of reporting in Africa from 2014 to 2019**

The data sources referred to in UIS.Stat reveal three groups among the 14 African countries with a trend at the primary level, that is to say with a status of 4. Of the 14, 11 are within the francophone CONFEMEN[18] group and therefore have 2014 and 2019 PASEC[19] values in four dimensions – at both primary levels and in both subjects[20]. A further two countries, Kenya and Uganda, each have a two-value trend in just lower primary reading based on national assessment programmes. Finally, Morocco has a two-value trend in end-of-primary mathematics by virtue of its participation in the international Grade 4 TIMSS[21] testing.

Another way of gauging data availability is to calculate, for each country, how many of the 36 data cells are populated with values. There are 36 data cells as there are six years in the 2014–19 series and six dimensions (three education levels and two subjects). No country has all 36 cells populated, and the maximum for any country is 10 cells. Even in the region with the best coverage, Europe and Northern America,[22] the average is just 5.1 of 36 cells populated. In Africa, the average is 2.5, and for the world outside Africa it is 2.8. These last two values become 3.1 and 4.8 if one weights by child population. In other words, in Africa just 7% of the available table cells in the reporting system are populated (using the unweighted measure), against 8% for the rest of the world.

Turning to the sources of the data, of the 149 percentage proficient statistics for Africa, just over 60% use PASEC.[23] UNICEF's Multiple Indicator Cluster Surveys (MICS) and national assessments each account for just over a tenth of the statistics, while the large global programmes of PISA[24] and TIMSS together account for just under one-tenth. A few countries, such as Tanzania, draw from assessments conducted within the People's Action for Learning network.

UIS.Stat provides breakdowns of SDG 4.1.1 proficiency statistics by sex, as required in the official definition of the indicator (see Section 1.). Of the 149 proficiency statistics for both sexes combined in Africa, 56% had breakdowns by sex, while for the rest of the world 77% of values had this breakdown. This discrepancy was largely due to the fact that gender-specific statistics from PASEC 2019 were missing when the UIS.Stat data were accessed.

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18   Conférence des ministres de l'Éducation des États et gouvernements de la Francophonie.
19   Programme d'analyse des systèmes educatifs (Programme for the Analysis of Education Systems).
20   Madagascar is an exception in this group as it has no lower primary reading value for 2014, though it has the other seven values.
21   Trends in International Mathematics and Science Study.
22   As defined in the 2021 Global Education Monitoring Report.
23   There are 94 PASEC-based values
24   Programme for International Student Assessment.

UIS.Stat also provides breakdowns of the statistics by socio-economic status using four dimensions: whether the learner lives in an urban area; whether a learner is from an 'affluent' household; whether the learner speaks the language of the test at home; and whether the learner is an immigrant. These breakdowns are less available than the breakdown by sex, both within Africa and in the rest of the world. To illustrate, for lower primary reading, the highest availability across the four dimensions in Africa is for 'affluence'; 12 of 37 statistics have this breakdown. Only two lower primary reading statistics have a breakdown by urban or non-urban area, and there are no breakdowns for the other two dimensions. For non-African statistics, fewer than a third of the statistics distinguish between urban and non-urban – the most available breakdown – and only 35% have a breakdown using any of the four dimensions.

2.2. Proficiency levels and trends based on the indicator values

Table 2 provides a summary of the means and trends, in terms of annual slopes, of indicator 4.1.1 values in Africa and the rest of the developing world. The latter category consists of 81 countries classified as low or middle income in 2020.[25] It is clear from the table that data are relatively available at the primary level in Africa: Almost half of countries have data on reading at the lower primary level, and a third at the end-of-primary level. In the rest of the developing world, data coverage is worst at the primary level. From an education planning perspective, Africa's situation is arguably better given the importance of interventions in the early grades. Africa has no countries with a 100% proficiency level. The 100% maximum values for the rest of the world are accounted for by just two countries: Cuba and Nepal. Mean values in Africa, whether weighted by the child population or not, are always lower than in the rest of the developing world, which is not surprising given the broader development challenges Africa faces. While large downward slopes in terms of percentage points of proficiency per year are not common in Africa or elsewhere, annual gains that may be too large to be a true reflection of reality exist in both parts of the world. As will be discussed in Section 2., slopes, in the sense of annual improvements, of 3.0 percentage points are considered very difficult to achieve, yet Table 2 suggests they are the norm, for instance in lower primary reading, in Africa and the rest of the world.

Table 2: SDG 4.1.1 means and slopes

	Africa (55 countries)						Rest of developing world (81 countries)					
	% of countries	Min.	Max.	Mean	Mean wgt.	Slope	% of countries	Min.	Max.	Mean	Mean wgt.	Slope
LP read.	45	5	79	31	29	4.3	21	12	97	55	57	3
LP math.	44	1	98	41	35	2.8	20	12	97	48	58	3
EP read.	33	5	76	28	31	1.5	26	2	100	57	49	0.4
EP math.	35	2	73	20	28	-0.1	37	8	100	50	39	1.1
LS read.	13	5	49	24	29		48	8	100	51	53	-0.6
LS math.	15	2	42	19	21		46	8	100	46	52	

Note: LP: lower primary level; EP: end-of-primary level"; LS: lower secondary level

The six diagrammatic maps in Figure 3, Figure 4 and Figure 5 provide national-level detail behind the Africa aggregates provided in Table 2. The low availability of data at the lower secondary level is evident in Figure 5. While many percentage proficient statistics – the national values shown in the map – are credible, some raise questions. For instance, Burundi's very high 79% reading proficiency value at the lower primary level (Figure 3), when compared to the country's corresponding figure of 6% at the end of primary (Figure 4), suggests either or both of the statistics are not a true reflection of reality.[26] The credibility of these level statistics is examined in detail in Section 3., where SDG 4.1.1 indicator values are compared to other statistics.

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[25] World Bank categories used.
[26] Each of these two statistics represents the mean across two years, 2014 and 2019. In each of these years, a very similar contrast between lower primary and end-of-primary performance in reading is seen.

Though many of the SDG 4.1.1 statistics are based on sample data, they carry no confidence intervals. PASEC provides an idea of what differences across countries, or over time, can be considered statistically significant. Specifically, PASEC's assessment of what differences in the mean score are significant, applied to the percentage proficient statistics, indicates that with regard to the latter, the difference should be nine percentage points or more to be considered statistically significant.[27] Thus, in lower primary, reading proficiency in Côte d'Ivoire (25%) cannot be considered worse than that in Niger (27%) but can be considered worse than that in Senegal (38%) (Figure 3).

Annual changes in the percentage proficient that exceed the estimated limit of 3.0 percentage points mentioned above are seen for several countries. Gains for reading reach as high as 13 percentage points a year (for Uganda) at the lower primary level and 5 percentage points a year (for Benin) at the end of primary. At the other extreme, Figure 4 displays a high level of deterioration, at four points a year, for end-of-primary mathematics in Burundi.

Figure 3: Lower primary values for 4.1.1
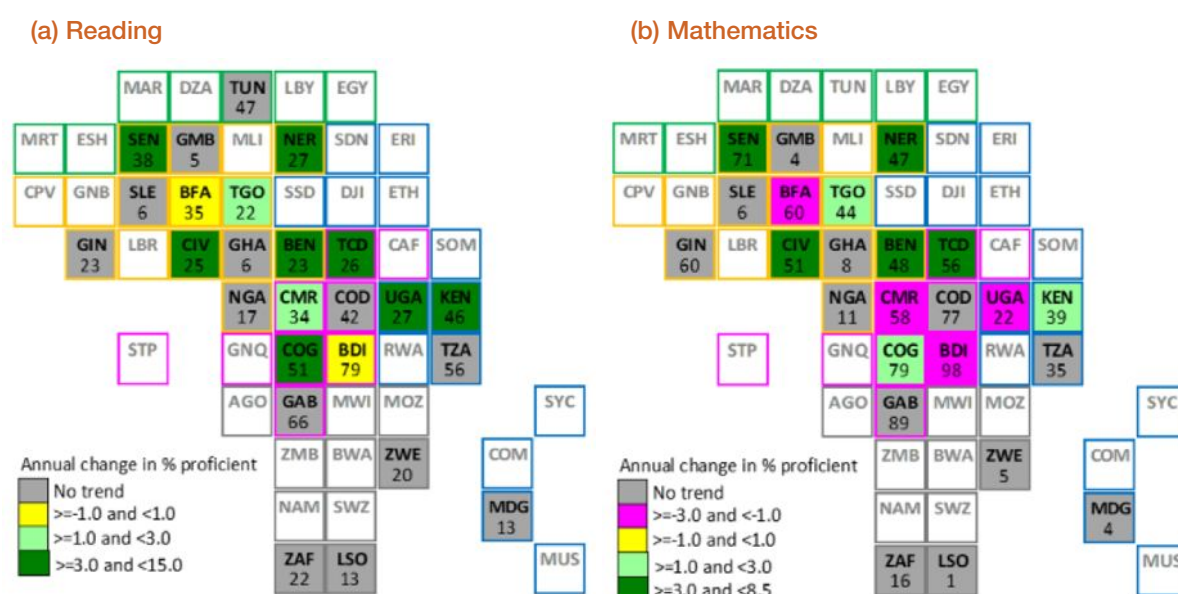
Source: UIS.Stat in May 2021. Also applies to the next two figures.

Note: Values per country are percentages, while shading reflects the annual change in this percentage where there was more than one data point (in which case the level indicated for the country is the mean).

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27   CONFEMEN 2020, p. 68, compared to UIS.Stat.

Figure 4: End-of-primary values for 4.1.1

(a) Reading   (b) Mathematics
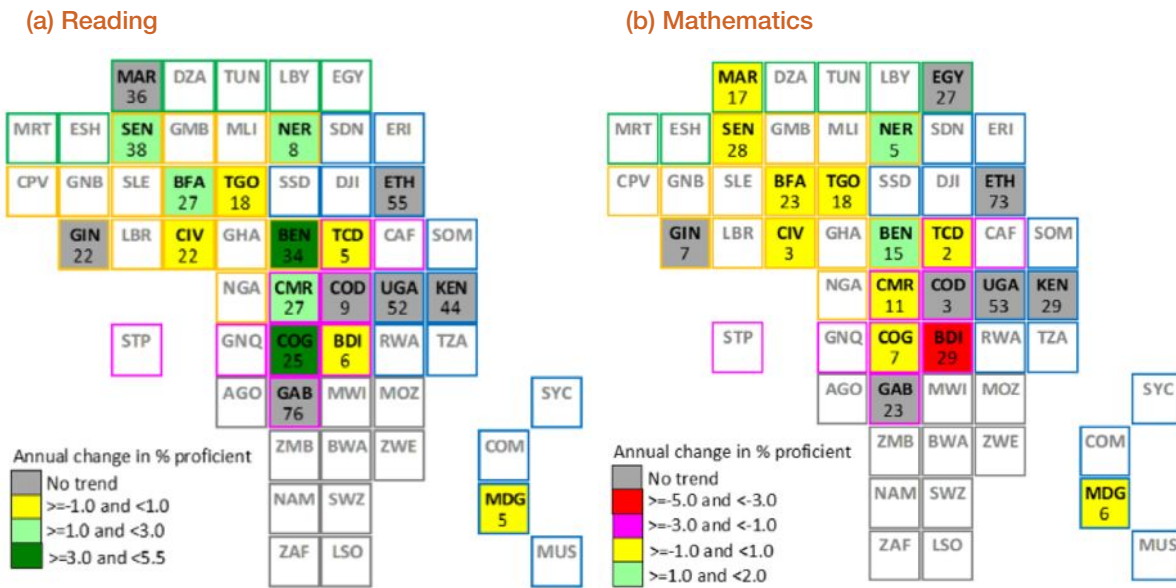
Figure 5: Lower secondary values for 4.1.1

(a) Reading   (b) Mathematics
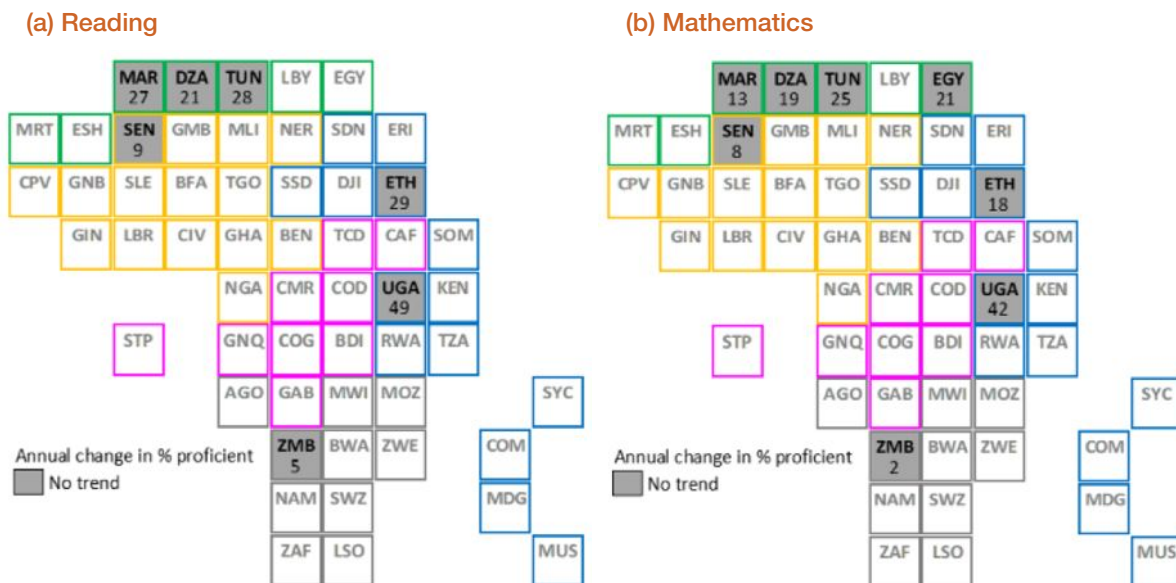
Correlations across subjects and across school levels are examined in more detail in Table 3. These correlations use values from the same country and year for each observation; hence these are 'within-period' correlations. The correlation coefficients seen in the table do not reflect the consistency of results over time, which will be discussed in Section 3.. The within-period correlations are often high. For instance, for the 35 instances, or observations, in Africa where a proficiency statistic was available at the lower primary level for reading and for mathematics, the correlation across the two subjects was high, at .81. The two subjects follow each other closely. The correlations across subjects are also high in the rest of the world,[1] always above .90. The low cross-subject correlation at the end of primary, in particular among PASEC countries, reflects the problems seen in Figure 4, where many mathematics statistics appear lower than expected.

Table 3: Within-period correlations

Correlations	Africa		Africa just PASEC		Rest of world	
	Obs.	Corr.	Obs.	Corr.	Obs.	Corr.
Across subjects, just lower primary	35	0.81	23	0.95	15	0.94
Across subjects, just end of primary	28	0.6	24	0.39	16	0.92
Across subjects, just lower secondary	6	0.98			126	0.92
Across subjects, all levels	69	0.72	47	0.69	157	0.92
Across primary levels, just reading	25	0.23	23	0.22	6	0.87
Across primary levels, just mathematics	25	0.01	23	0.42	10	0.91
Across primary levels, both subjects	50	-0.04	46	0.04	16	0.9
Across prim-sec levels, just reading					4	0.96
Across prim-sec levels, just mathematics	3	0.94			53	0.92
Across prim-sec levels, all subjects	4	0.64			57	0.92

Correlations across levels, unlike correlations across subjects, all tend to be low in the case of Africa, despite being high in the rest of the world. To illustrate, the ranking of 25 African countries with the required values in mathematics differs considerably between the lower primary and end-of-primary levels. The situation is somewhat better if one focuses just on PASEC mathematics values, which yeilds a correlation of .42. Within PASEC, reading displays an even less favorable situation, with a correlation across levels of just .22.[28] Outside of Africa, correlations across levels are around .90. However, these differences in data consistency between Africa and the rest of the world must be seen against the fact that Africa has progressed further than the rest of the world when it comes to covering both subjects and both levels within the primary schooling band. The number of observations reflected in Table 3 is always higher for Africa than for the rest of the world at the primary level.

Figure 6 displays 23 lower primary and 24 end-of-primary points for 11 PASEC countries. It thus reflects the PASEC observations covered in the first two rows of Table 3.[29] The graph clarifies that the end-of-primary points line up relatively well, despite a low correlation coefficient.

Figure 6: Correlations across subjects in PASEC
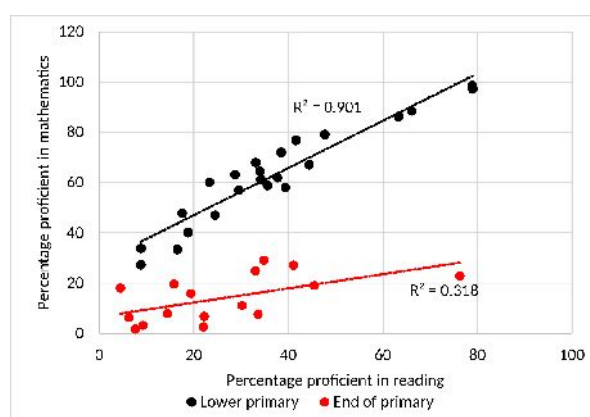
Note: Each point represents a country and a year (either 2014 or 2019).

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[28]   Note that a country can have more than one observation in any analysis if data exist for more than one year. There are 23 PASEC 'Across primary levels, just reading' observations as ten countries have statistics for two years (2014 and 2019).

[29]   Correlation coefficients, seen in Table 3, are calculated differently from the regression coefficients (R2) of Figure 6, though they are both indicators of the degree of alignment across the series.

The general pattern with respect to proficiency statistics is that the higher the school grade, the lower the proficiency.[30] This is seen in the UIS.Stat statistics for Africa and the world as a whole. Figure 7 illustrates this pattern, with end-of-primary values that tend to be lower than lower primary values. This is likely the result of very ambitious curricula and a gap between curriculum expectations and actual competencies that widens as learners age. This pattern would be seen in assessment results given that assessment standards tend to be based in some way on the curriculum.

Figure 7: Proficiency losses across levels: primary reading
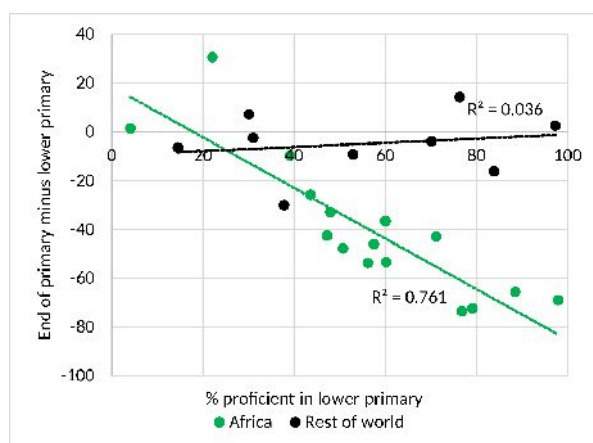
Note: Each point represents a country and a year (either 2014 or 2019).

Moreover, it is clear in the case of Africa, but less so in the rest of the world, that the higher the lower primary-level proficiency, the greater the decline between lower primary and end of primary. This is true for primary reading, shown in Figure 7, but also primary mathematics (not shown in the graph).

2.3. Gender-specific patterns

The extent to which female proficiency exceeds or falls below male proficiency in lower primary reading is illustrated in Figure 8. In Africa, of the 24 data points, 13 reflect a higher level of proficiency among females, while 10 reflect higher proficiency among males. The general pattern is thus for females to outperform males slightly in Africa, and to a more noticeable extent in the rest of the world. In mathematics at the end of primary, the female advantage outside Africa is less prominent, and in Africa there are more instances of higher male proficiency than of higher female proficiency, as shown in Figure 9. The learning advantage displayed by girls across the world, especially in reading, has been a subject of research.[31] Though some of the patterns might be explained by higher levels of participation among boys than girls, resulting in the exclusion of less socio-economically advantaged girls with lower proficiency, studies have shown in many countries, including developing countries, that girls' proficiency advantage remains when participation is taken into account.[32]

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[30] UIS 2020, p.27.
[31] Saito 2011; Spaull and Makaluza 2019.
[32] Buhl-Wiggers, Jones, S. and Thornton, R. 2021.

Figure 8: Comparison by gender: lower primary reading
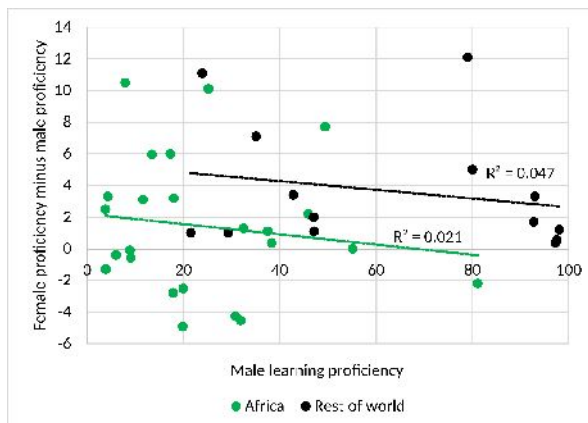
Figure 9: Comparison by gender: end-of-primary mathematics
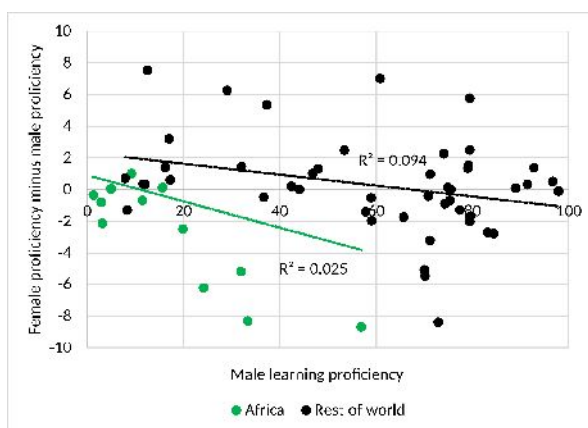
Figure 10 draws from all of the UIS.Stat gender-specific SDG 4.1.1 values available for Africa, with means across various gender differences used where results from more than one assessment were available. There are slightly more countries where females outperformed males by more than one percentage point than countries where they performed more than one point below males. Eight of the nine countries where females underperformed are in Central Africa and Western Africa.

Figure 10: Proficiency differences by gender
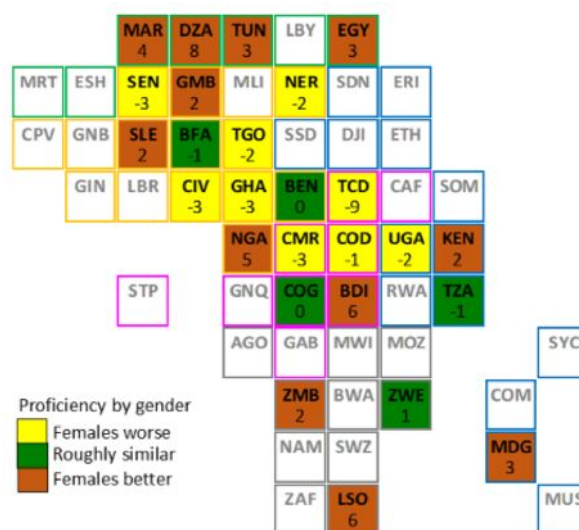
Note: Values per country represent the percentage-point difference between female and male learning proficiency. A value could be the mean across several values, in the case of countries with statistics from several subjects, years and schooling levels. 'Roughly similar' represents values in the range of -1.0 to 1.0. Values shown in the diagram are rounded to the nearest percentage point.

As discussed in Section 4.3., if proficiency in the child population, as opposed to among learners, is examined, a clear proficiency advantage for girls emerges in Africa. Lower school participation rates for girls are thus not a major driver of the patterns identified above.

3.Reliability of the trends

In a context where the aim is to improve learning, trends must be carefully defined and measured. Unreliable trends are perhaps even more worrying than unreliable levels: It is arguably a more serious problem if education stakeholders in country X do not know whether learning is in fact improving than if they are unsure exactly how well country X performs relative to neighbouring country Y.

In Africa, there are 47 trends specific to a country, education level and subject in the 2014–19 SDG 4.1.1 data. The trends are from 14 countries, and all are based on just two points in time. The 47 trends are indicated by green markers in Figure 11. There is limited research into how large changes over time can realistically be, but what analysis is available suggests a percentage proficient indicator does not change more than around 3.0 percentage points a year, at the very most.[33] This is in a positive direction. The likelihood of a negative annual change of 3.0 percentage points is probably even smaller, given that governments and the population strive to improve learning and hardly ever attempt to worsen it. Of the 47 African trends, over a third of the African trends are 3.0 percentage points or greater in absolute terms per year. It is clear from Figure 11 that most of these are large positive changes. The largest is that for lower primary reading in Uganda, where the official SDG 4.1.1 values point to an improvement from 20% in 2014 to 33% in 2015.

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[33]   UIS 2019a, p. 21.

Figure 11: Levels and trends for 4.1.1 compared
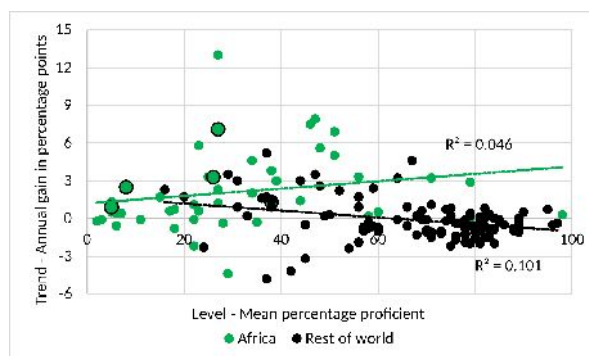
Of the 47 trends, 42 are from the PASEC programme, and of these, 14 are greater than 3.0 in absolute terms. Examining the official PASEC trends, which are from ten countries,[34] in more detail is thus important. Moreover, the availability of documentation from PASEC makes it a relatively easy programme to analyse. Importantly, for the purpose of SDG 4.1.1, learners were considered proficient if they reached the top two performance levels in PASEC's lower primary competency table, and if they reached the top performance level in PASEC's end-of-primary competency table.[35]

Four of the green markers in Figure 11 are enlarged. These represent reading gains at the two primary levels for Chad and Niger. Though these four trends appear in the SDG 4.1.1 statistics, the 2019 PASEC report indicates that the values are not comparable owing to a change in the language tested.[36] If one ignores these values for Chad and Niger, the largest PASEC reading gain is that of Benin at the lower primary level, from 9% proficient in 2014 to 38% in 2019 (5.8 points a year). In mathematics, the largest gain is in Niger, at 7.9 points a year, followed by Côte d'Ivoire at 6.9 points a year, both at the lower primary level.

While over a third of the African trends are 3.0 percentage points or greater in absolute terms, this is true for just 10% of the trends in the rest of the world. Moreover, in the rest of the world gains decline the higher the general level of proficiency in the country. This is what the evidence suggests one should expect. As proficiency moves closer to 100% it becomes more difficult to improve further, as the schooling system is left with categories of non-proficient learners who are the most difficult to deal with. In Africa, however, higher general levels of proficiency are associated with larger annual gains; see the upwardly sloping trendline in Figure 11. This contrast persists if one limits the comparison to points where the mean is 60% or less. The contrast is also seen if one graphs only reading results or only mathematics results.

Not only does PASEC point to apparently impressive gains, but also several PASEC countries have seen such gains occur while enrollments have increased substantially. The markers in Figure 12, when read against the horizontal axis, point to enrollment growth reaching, for instance, 26% over the five years in Côte d'Ivoire. Typically, rising enrollments would limit proficiency improvements for two reasons. Firstly, insofar as this trend is the result of higher levels of school participation in the population, new categories of the population that are successfully brought into the system tend to be the most socio-economically disadvantaged, with the most learning barriers related to home background.[37] Secondly, enrolment growth tends to stretch the resources of a schooling system and result in larger classes, developments that are likely to impact negatively on proficiency. Yet in the case of the PASEC countries, higher proficiency and higher enrolment have occurred simultaneously, calling into question to what extent the higher PASEC country enrolment is a result of higher participation rates. This is not easy to establish, given data limitations,[38] but the population growth figures that inform the 2019 PASEC

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[34] An eleventh PASEC country, Madagascar, has a 2014-to-2019 trend just for end-of-primary reading in UIS.Stat, and this trend draws from the PASEC data. However, the official CONFEMEN (2020) report covers the trends of just ten countries.

[35] This translates into levels 3 and 4 for reading and levels 2 and 3 for mathematics at lower primary, and levels 4 for reading and 3 for mathematics at end of primary (Level 3 is the highest level in mathematics). The term 'reading' is used here, for consistency with the SDG terminology, though PASEC uses 'language' ('langue').

[36] CONFEMEN (2020, pp. 27, 220). In Niger, testing shifted from French to Hausa and Zarma. In Chad, the shift was from French to Arabic. Other languages used by PASEC are English, Kirundi and Malagasy

[37] Taylor and Spaull 2015.

[38] Participation statistics based on household survey data tend to be too rare to establish trends, and statistics not based on household data have serious comparability issues – see Stukel, D.M. and Feroz-Zada, Y. (2018).

report suggest that enrolment growth is mostly the result of high population growth, not increasing participation. Annual population growth in the PASEC countries is between 2.4% and 3.8%,[39] which translates to 13% to 20% over five years. This serves as a reminder of the very high rate of population growth across much of the Africa region.[40]

Figure 12: Enrolments and learning gains for PASEC countries
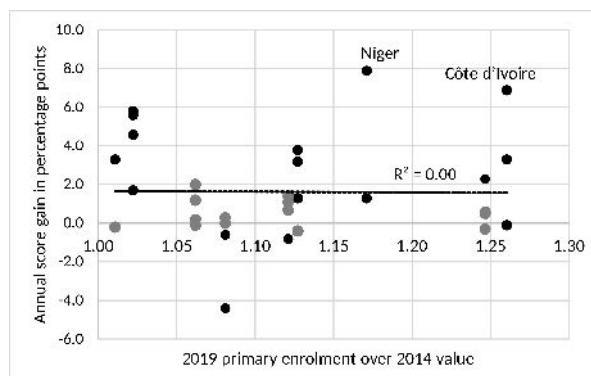
Source: Values along the vertical axis reflect the 2019-to-2014 ratio using the UIS.Stat variable 'Enrolment in primary education, both sexes (number)'. Note: Markers coloured grey represent changes not considered significantly different from zero according to the official PASEC report when using means.[41] As confirmed below, the correlation between percentage proficient and the country mean is not perfect, which explains why certain markers close to zero in this graph are coloured black.

It is possible that remarkable positive learning gains have been experienced by some African countries. However, it is also important to consider carefully how reliable apparent trends are. Unreliable trends could create unrealistic expectations for further improvements. A measure of sharp gains in one period, if not reliable, could lead to an apparent loss in the following period, even if there has in fact not been a loss. Inaccurate measures of gains or losses can influence discussions around strategies for improving learning in undesirable ways. For instance, a report of a decline where in fact there was a gain could lead to the removal of policies that are working.

PASEC provides documentation on how comparability over time was pursued. Random nationally representative samples of schools, drawn from the national list of schools, were used, and steps were taken to ensure that the administration of tests in schools occurred as planned. The comparability of test results over time is achieved through repeated and secure 'anchor items', or questions repeated across the two years and not made publicly available.[42] PASEC has undergone a multiyear process of strengthening the comparability and validity of its statistics[43] and is now easily the most technically robust regional assessment programme in Africa. However, it remains a programme in development, and the level of detail in its technical documentation is still well below that of programmes such as TIMSS or PIRLS. It is thus not always easy to evaluate whether methodological problems may have influenced published trends.

Two key risks that could compromise the accuracy of trends in any programme are sampling irregularities and the incorrect administration of tests in the classroom. With regard to the latter problem, cheating during the testing or even marking processes in various standardized testing programmes has been documented, and patterns in the SACMEQ[44] data suggest that cheating during test administration occurred in some regions within countries.[45] Sampling irregularities where, for instance, middle-class learners are over-represented in one year but not another would lead to inaccurate trend information. However, sampling irregularities can also occur when learners are not tested at the same point in the school year. For instance, if in one year learners are tested in August and in a second year in November, the samples are strictly speaking not comparable, as the November group would have had the opportunity to learn more than the August group. Evidence of these kinds of sampling irregularities

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[39]   CONFEMEN 2020, p. 35.
[40]   UIS 2020, p. 53.
[41]   CONFEMEN 2020, pp.221-226.
[42]   CONFEMEN 2020, pp. 32, 33, 220.
[43]   Charton 2017.
[44]   Southern and Eastern Africa Consortium for Monitoring Educational Quality.
[45]   Gustafsson and Nuga Deliwe 2017.

exist, even in the case of well-resourced programmes with good documentation.[46] In particular, sampling issues experienced by individual countries are often poorly documented, yet this is where the problem may lie.

The case of South Africa's 2011-to-2016 PIRLS[47] trend underlines the importance of careful analysis of the microdata by national authorities, in particular where there are complex differences in the measurement scales of different countries.[48] In the case of South Africa, after a re-evaluation of the data it was found that there had been a considerable improvement, although initially no improvement was reported. The problem was thus one neither of sampling nor of test administration, but of how the raw data were converted to trends over time.

On the matter of the PASEC samples, a noteworthy trend is the very large increase in the percentage of the sample in private schools across many countries – the vertical axis of Figure 13. Benin saw its percentage of learners in private schools increase from 16% to 28% between 2014 and 2019, according to the PASEC data.[49] However, a large change for Benin, from 19% to 25%, between the same two years is also visible in the separate UIS.Stat data, collected from ministries of education. A few other countries also display large changes in private school participation in the UIS.Stat data. Yet certain discrepancies across the UIS.Stat and PASEC values are worth noting. In the case of Burkina Faso, the PASEC samples may have exaggerated the increase in private school enrolment, while in Chad the PASEC samples may have underestimated this increase. These inaccuracies might have led to an overestimation of the proficiency improvements in Burkina Faso and an underestimation in the case of Chad, assuming that private schools tend to produce better results than public schools.

Figure 13: Changes in private school participation in PASEC
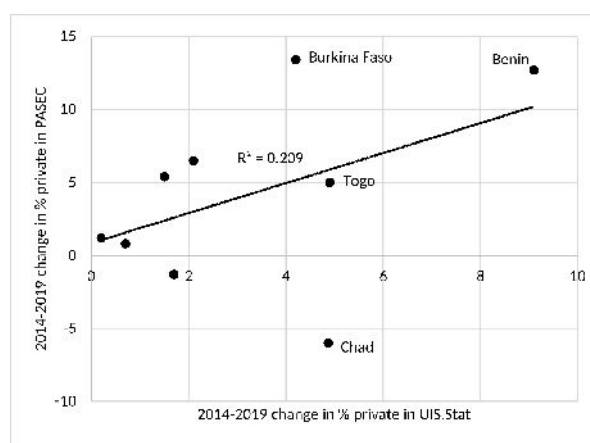
Figure 14 provides an alternative approach to assessing the correctness of the PASEC national samples. Here access to electricity as reported by Grade 6 learners tested in PASEC in 2014 and 2019 is compared to 2014 and 2019 electricity access statistics in the World Development Indicators (WDIs). Access to electricity in the general population is an SDG indicator.[50] It is evident from Figure 14, assuming samples are representative of the population of learners, that learners tend to over-report access to electricity as nearly all points are above the diagonal dashed line. This is plausible as learners may be uncomfortable revealing the extent of poverty in the home. However, one would not expect the magnitude of this over-reporting to change significantly over five years. Countries with large vertical differences between 2014 and 2019 – in other words with large apparent changes in access to electricity – on the basis of learner reporting deserve special attention. Access in Burkina Faso improved from 38% to 71% in two years, according to PASEC, although the WDI value remained unchanged. This finding strengthens the point made above that the PASEC sample may have over-represented learners from higher socio-economic backgrounds in 2019, which is very likely to have affected the learning proficiency statistics.

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[46] Carnoy et al. 2015; Dang et al. 2020; Jerrim 2013.
[47] Progress in International Reading Literacy Study.
[48] Gustafsson 2020.
[49] CONFEMEN 2015, p. 92, 2020, p. 139.
[50] Indicator 7.1.1.

Figure 14: Changes in PASEC and WDI access to household electricity
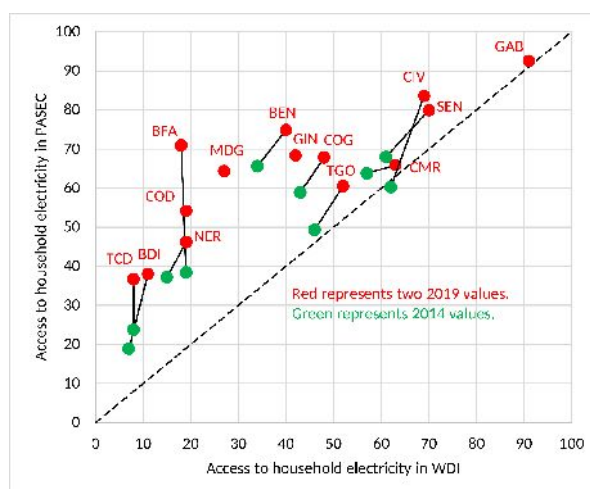
One way of controlling for possible sampling irregularities is to examine the trends by specific socio-economic indicators. Such analysis suggests that the improvements reported by PASEC are reliable. Table 4 analyses end-of-primary reading in Benin and shows that the mean scores in the bottom two book access categories – 'No books' and 'Enough books to fill a shelf' – saw very large increases.[51] To some extent the change in the socio-economic composition of the two samples appears to be behind the overall improvement, but most of the improvement appears to be independent of socio-economic category. Specifically, if one assumes that the socio-economic composition was the same in 2019 as it was in 2014, then the 2019 overall score becomes 576 instead of the reported 586. The official 2014 overall score was 523. The gain across the two years remains large, though it declines from 63 to 53 score points, when this simulation is run. This suggests that even if home background circumstances had not improved, a large improvement would have been seen. A similar analysis applied to Congo, the country with the second-largest end-of-primary reading gain, results in the gain declining from 39 to 36. Here, too, the implication is that socio-economic differences were not behind the gains. There is thus a reduced possibility that sampling irregularities explain the very large gains.

Table 4: Scores and home background for Benin end-of-primary reading

	2014		2019	
	% of learners	Mean score	% of learners	Mean score
Enough books to fill a bookcase	3	601	11	607
Enough books to fill two shelves	9	598	18	600
Enough books to fill a shelf	44	520	69	598
No books	44	500	2	547
Estimated total	100	520	100	598
Official total		523		586
Adjusted total using 2014 composition				576

Source: CONFEMEN (2015); CONFEMEN (2020)

The analysis presented here is crude and indicative. Ideally, analysts, in particular from the countries concerned, should interrogate the underlying microdata in more depth and compare socio-economic trends in the PASEC data to similar trends in separate household survey data, where available. PASEC makes its own microdata

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[51]   The focus here is on end of primary as the book categories were less detailed for lower primary.

available on request, in recognition of the importance of analysing the data beyond the production of the official PASEC reports.

While SACMEQ results from the 2007 and especially the 2013 waves of this programme have very limited documentation in the public domain, enough is available to establish trends across most SACMEQ countries in terms of mean scores. Doing so allows for a comparison against the trends in PASEC. Figure 15 confirms what one would expect, namely that the mean score and percentage proficient statistics correlate strongly, though not perfectly. The correlation would not be 1.00 because any mean score can be associated with many different underlying distributions of scores.

Figure 15: Changes in mean scores and proficiency in PASEC
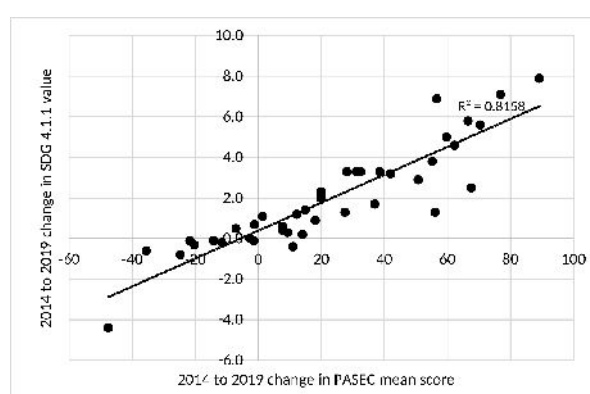
Source: CONFEMEN (2015); CONFEMEN (2020)

Figure 16 illustrates the reading trends across the two programmes at the end-of-primary level. SACMEQ tests only Grade 6 and is discussed in more detail in Section 4.1.. The magnitudes of the changes over time are roughly comparable across the two programmes as in each the standard deviations at the country level are around 100.[52] Roughly, one can think of a gain of 100 score points as the equivalent of three grades in the schooling system.[53] To illustrate, Senegal's gain of 28 points in five years shown in Figure 16 means that after this period of time learners in the tested grade performed almost as well as learners in the next grade at the start of the period.

The average gain for the ten PASEC countries between 2014 and 2019 was 20 score points, or 4 points a year. For SACMEQ, the average gain came to 1.7 points per year in the 2000–07 period and 3.7 points a year for 2007–13. The recent gains are thus similar across the two programmes. They are also considerable, implying that around every eight years proficiency would move up by one grade. The four-points-a-year gain is close to the assumed maximum possible of six points,[54] and four points a year is the average across all countries in each programme (the most recent period for SACMEQ being used). In SACMEQ, South Africa and Lesotho reached the six-point threshold, though no countries exceeded it. In PASEC, two countries, Benin and Congo, exceeded this maximum (Niger also did, but here the language changed, as discussed previously).

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[52]   CONFEMEN 2020, p. 81; Sandefur 2016, p. 9.
[53]   UIS 2021a, p. 14.
[54]   UIS 2019b.

Figure 16: PASEC and SACMEQ trends in end-of-primary reading

(a) PASEC   **(b) SACMEQ**
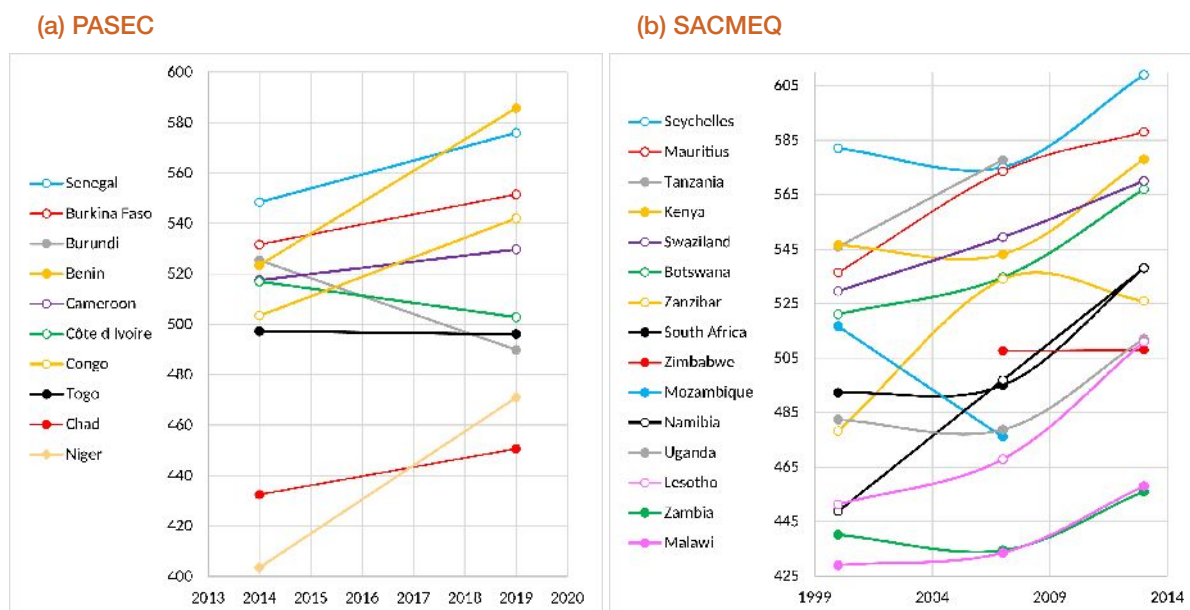
Source: CONFEMEN (2015); CONFEMEN (2020); SACMEQ sources are given in Section 4.1..

A consistency index was calculated for each country from Figure 16 for which four trends were available: across two subjects and levels in the case of PASEC, and across two subjects and two periods in the case of SACMEQ. The index was calculated somewhat differently for the two programmes in recognition of the fact that one can expect more inconsistency in the case of SACMEQ as two periods were covered. For PASEC countries, the standard deviation across the four gains (or losses) was used. For SACMEQ, a similar standard deviation was calculated for the first period, where there were two gains, and again for the second period, and the average across the two standard deviations was used. Finally, SACMEQ index values were inflated by a factor of 20 over 8 so that SACMEQ index values would produce the same mean as the PASEC index values. The higher the index value for each country, the greater the inconsistency across the trends.

Figure 17 shows the index values per country. The ranges in index values in each programme are similar. Mauritius in SACMEQ and Cameroon in PASEC display an especially good level of consistency. The high inconsistency in Côte d'Ivoire in part reflects the fact that in Grade 2 reading improved by a whole grade, while in Grade 6 it deteriorated by half a grade. This kind of contrast should raise questions about whether highly unusual developments occurred in the schooling sector, or whether there is a measurement error.

Figure 17: Within-country consistency of PASEC and SACMEQ trends
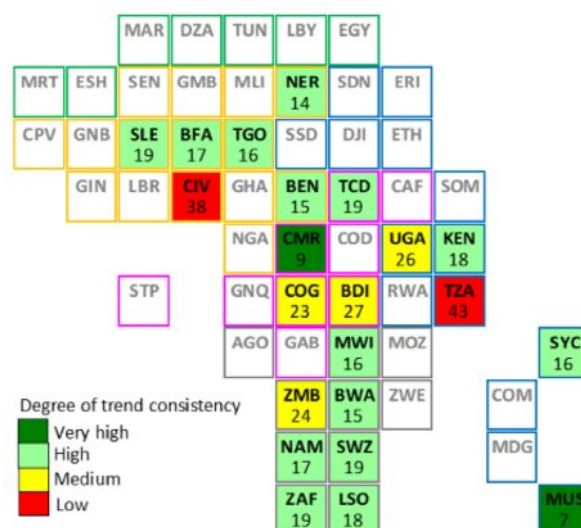
Note: The index value for Tanzania (TZA) uses the simple mean across Tanzania and Zanzibar, which are tested separately in SACMEQ. For 2007 to 2013, only Zanzibar's trend was used as mainland Tanzania has no published trend.

4. What a wider range of data reveals about proficiency levels

This section broadens the analysis of proficiency levels in Africa by examining additional sources of data. After a discussion of various sources, Section 4.7. examines the alignment across data sources, including the published SDG 4.1.1 values discussed previously.

4.1. SACMEQ

The SACMEQ average scores by country used for Figure 16 are shown in Table 5. The reason why SACMEQ has not been used for proficiency statistics in the SDG system is that officially endorsed SACMEQ statistics have not been readily available. Unlike PASEC, SACMEQ has not produced programme-wide reports and instead relies on the publication of statistics by national authorities. The figures in Table 5 are largely drawn from a series of tables in one national report.[55] Several national reports are not currently available. SACMEQ is a particularly important African monitoring programme, but it has been argued that it requires better resourcing and a clearer strategy on how to disseminate results and technical documentation.[56]

Table 5: SACMEQ results from 2000 to 2013

SACMEQ wave:	Reading			Mathematics		
	II	III	IV	II	III	IV
	2000	2007	2013	2000	2007	2013
Botswana	521	535	567	513	521	563
Eswatini	530	549	570	517	541	578
Kenya	547	543	578	563	557	608

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[55] Care should be taken with respect to the 2013 SACMEQ results, also referred to as SACMEQ IV results. Preliminary results were circulated and discussed, for instance in the South African Parliament (see https://static.pmg.org.za/160913overview.pdf). After questions were raised about the credibility of the gains seen across all countries, results were re-examined and revised. Table 5 reflects the revised figures.
[56] See Teaching and Learning Educators' Network for Transformation (2020); also Burdett and Rawle (2017)

Lesotho	451	468	511	447	477	514
Malawi	429	434	458	433	447	479
Mauritius	536	574	588	585	623	644
Mozambique	517	476		530	484	
Namibia	449	497	538	431	471	522
Seychelles	582	575	609	554	551	599
South Africa	492	495	538	486	495	552
Tanzania	546	578		522	553	
Uganda	482	479	512	506	482	523
Zambia	440	434	456	435	435	477
Zanzibar	478	534	526	478	486	499
Zimbabwe		508	508		520	524

Sources: 2000 and 2007 values are from Makuwa (2010). Values for 2013 are all from Karogo et al. (2019, pp. 117–118), but some values are also found in Dwarkan (2017); Botswana: Ministry of Basic Education (2017); Namibia: Ministry of Education Arts and Culture (2015); and South Africa: Department of Basic Education (2017).

4.2. Multiple Indicator Cluster Surveys

UNICEF's MICS, which collects data from households, has since 2017 included a module on foundational learning among children. Thirteen African countries currently have published MICS learning proficiency results. In seven of these countries, MICS results have been used for reporting against SDG 4.1.1 indicators at the lower primary level. The MICS reports for the 13 countries explicitly report SDG 4.1.1 values using both possible denominators: enrolled learners and the total population of the relevant age group. For official SDG reporting, the value using learners as the denominator has been used, in line with general practice. Where MICS values are not used for official SDG reporting, this is in many cases because a PASEC lower primary value exists for the country, and so PASEC rather than the MICS has been used as the preferred data source. The 13 reading and mathematics values reflected in the currently available MICS reports are shown in Figure 18.

Figure 18: SDG 4.1.1 values derived from MICS

(a) Reading

(b) Mathematics
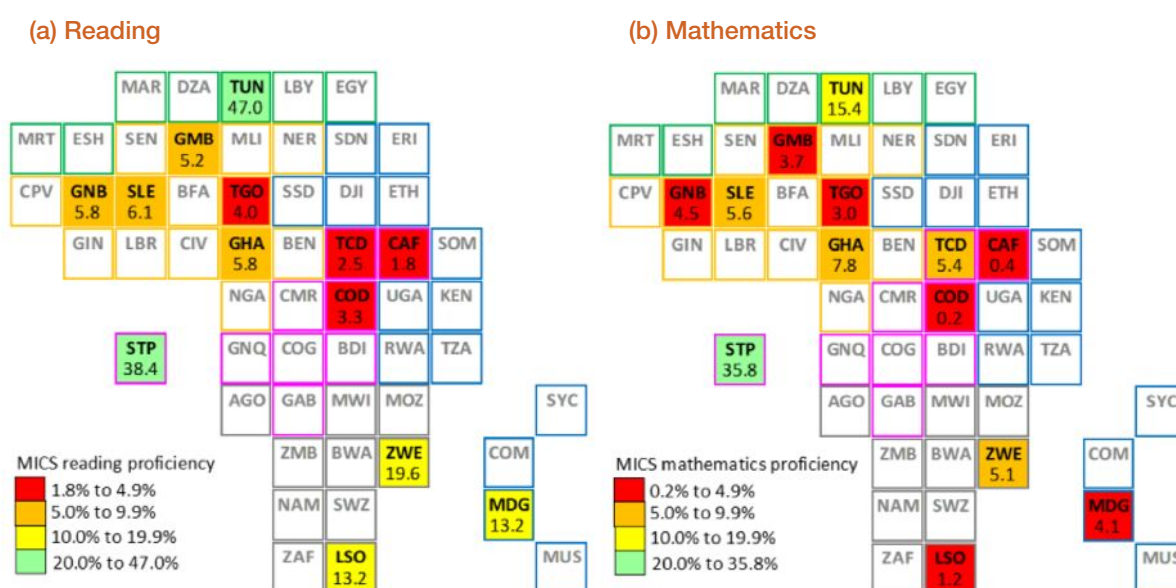
Source: Country-specific MICS reports available at https://mics.unicef.org.

Note: Values shown use enrolled learners as the denominator.

There are advantages and disadvantages associated with using household-derived data for monitoring learning proficiency. A key advantage is that this method allows for proficiency testing of children who are not in school. Figure 19 draws from the MICS microdata, available to researchers on request, and illustrates what percentage of children with reading test results are not in 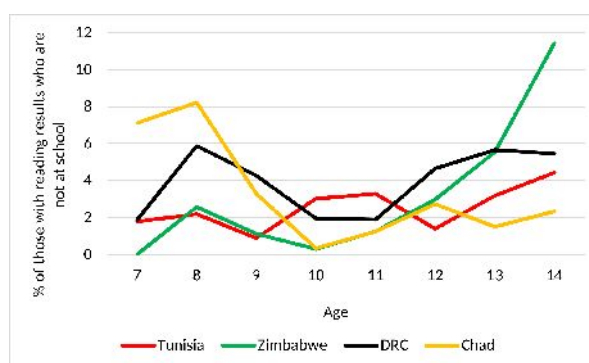school. This percentage can be high, for instance around 8% for the youngest in Chad, and almost 12% for 14-year-olds in Zimbabwe. The reading competencies of these children would not be monitored in a school-based assessment.

Figure 19: Reporting on out-of-school children through MICS

Source: MICS microdata from 2018 or 2019, obtained through https://mics.unicef.org.

Note: Household weights used here and in the next graph. DRC is Democratic Republic of the Congo.

A disadvantage with household-based assessments is that the risk of a child being absent from the home is likely to be higher than the risk of an enrolled child being absent from school. The approach in MICS is to select one child per household for testing, using the MICS Foundational Learning Module, if the household has children in the age range of 7 to 14.[57] Figure 20 shows that selected children are frequently not available for the test, and children from poorer households are the least likely to be available. While to some extent weights in the data can be used to reduce a bias in the aggregate statistics, this approach resolves the problem only partially given the inevitable uncertainty around the proficiency levels of those children who were not tested.

Figure 20: Children who are tested in MICS

Source: MICS microdata from 2018 or 2019, obtained through https://mics.unicef.org.
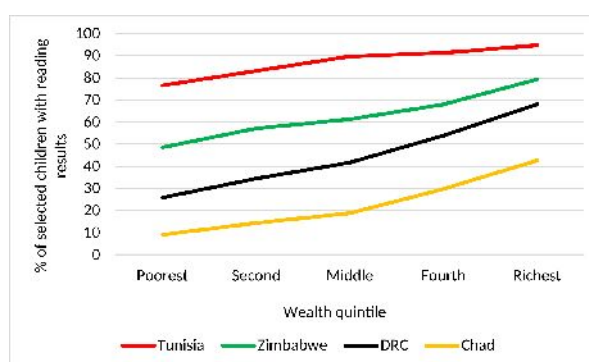
Note: The values reflected here are slightly lower than those seen in the official MICS reports, as the values reflect children who had a score for words read correctly in a reading passage, which is necessary for calculating SDG 4.1.1 for reading (UNICEF, 2020, p. 37). For instance, the overall figure for Tunisia across the five wealth quintiles here is 87%, compared with 97% in Statistiques Tunisie (2019, p. 313) in relation to selected children who 'completed' the module.

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57   UNICEF 2019, p. 15.

4.3. The World Bank-UIS's measure of learning poverty

In 2019 the World Bank, in collaboration with the UIS, introduced a measure of learning poverty reflecting the percentage of children at age 10, whether enrolled at school or not, who lacked basic reading skills.[58] The measure makes use of existing minimum thresholds in specific assessment programmes, such as PASEC and some national programmes. The aim is thus to use learning thresholds that are roughly comparable across countries, without complex adjustments to bring about greater comparability (see Section 4.4. below). In addition, estimates of the number of children who are not in school are used, together with the assumption that these children have not reached the minimum threshold. The 23 learning poverty values available for Africa are illustrated in Figure 21. The years of the source data for these values range from 2007 to 2019, though for three-quarters they are from 2015 or later.

Figure 21: Learning poverty

https://www.worldbank.org/en/topic/education/brief/learning-poverty-measure.
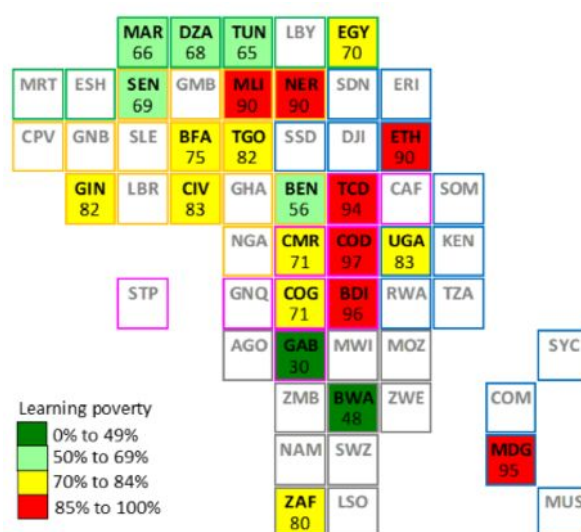
As shown in Figure 22, accounting for out-of-school children can result in differences of up to ten percentage points versus statistics derived from schools. In Senegal, 59% of learners are not proficient, but an estimated 10% of 10-year-olds are not in school, making the learning poverty measure 69%. In Tunisia, on the other hand, where very few children are out of school, the two statistics are almost equal. Of the 23 countries, Gabon displays the lowest level of learning poverty. Gabon's statistic relies on PASEC data (Gabon did not participate in PASEC 2014 but did participate in PASEC 2019). Benin emerges as having the third-lowest learning poverty value, and it was, moreover, the PASEC country with the largest gain between 2014 and 2019 in end-of-primary reading if one ignores Niger, where languages across the two years were different (see Figure 16).

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[58]   https://www.worldbank.org/en/topic/education/brief/learning-poverty-measure

Figure 22: Children who are tested in MICS
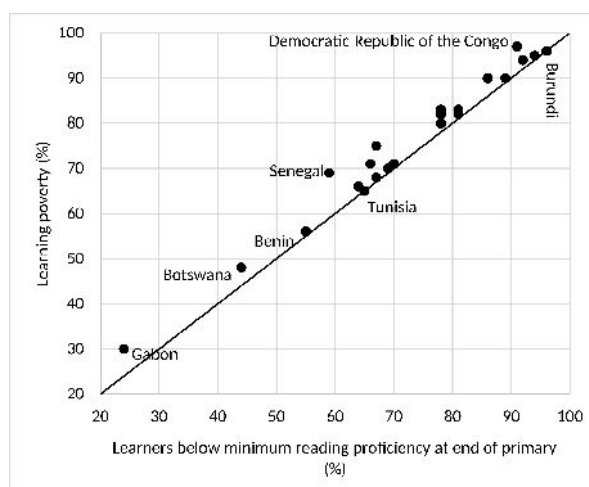
As for Figure 21.

The UIS-World Bank statistics discussed here indicate that 80% of Africa's learners are not at the required level of proficiency with respect to reading at the end of primary – here the child populations of the 23 countries, which represent 53% of Africa's total child population, are used as weights. Thus only 20% of primary learners in the 23 countries are proficient in reading. This figure drops to 18% when children who are not in school are considered, corresponding to a learning poverty rate of 82%.

Of the 23 countries, 19 have breakdowns by sex. The World Bank statistics indicate proficiency is worse for females in 3 of the 19 countries, whether the age cohort in the population or enrolled learners are considered. Using the population-based statistics, the three countries are Chad, the Democratic Republic of the Congo and Guinea. Using the learner-based statistics, the three are Chad, the Democratic Republic of the Congo and Burundi.[59]

4.4. Harmonized test scores

The World Bank's Human Capital Index includes harmonized test scores representing the mean performance of learners in Grade 8, using the scale of the TIMSS programme.[60] These scores exist even for countries that have not participated in TIMSS but where it is possible to adjust scores from another testing programme to the TIMSS scale because there are sufficient countries participating in more than one assessment programme. The available harmonized test scores for 46 African countries are illustrated in Figure 23. These scores cover more African countries than any other assessment-based series of data on learning proficiency currently available. In principle, harmonization across different testing programmes can help to clarify the proficiency situation across countries, yet in practice it is a complex process that may not resolve all comparability problems adequately.[61]

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[59] Based on the population-based values, males are less proficient in 14 countries, while using the learner-based values results in 15 countries with lower proficiency for males.

[60] For definition of harmonized learning scores see World Bank (2020, p. 132).

[61] UIS 2020, p. 19.

Figure 23: Harmonized test scores
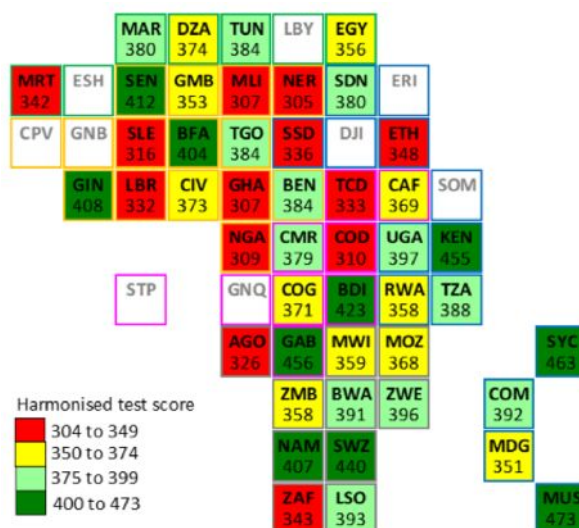
Source: World Bank (2020, p. 184)

4.5. World Economic Forum education quality indicators

For several years annually up to 2017, the World Economic Forum (WEF) published 'quality of primary education' indicators for a large number of countries as part of its Global Competitiveness Index. While the primary education indicator was based on the opinions of local business executives World Economic Forum (2017), [p. 333] and could therefore not be expected to represent learning proficiency reliably, it is included here due to the fact that it has been used to assess African education systems. There are instances in which the WEF values have been incorrectly interpreted as if they were based on the testing of children.[62] In 2018, the WEF switched to an indicator that was less likely to be misinterpreted, labelled 'critical thinking in teaching', but also based on the opinions of business executives. The 36 African countries with 'quality of primary education' values in the WEF's 2017–18 Global Competitiveness Report, and the 38 countries in 2019 with 'critical thinking in teaching',World Economic Forum (2019) are reflected in Figure 24.

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[62]   See for instance https://www.polity.org.za/article/sa-maths-science-teaching-worst-in-world-wef-2014-09-09

Figure 24: WEF education indicators

(a) Quality of primary

WEF quality of primary
- ■ 2.0 to 2.7
- ■ 2.8 to 3.2
- ■ 3.3 to 3.9
- ■ 4.0 to 4.5

(b) Critical thinking in teaching

Critcal thinking in teaching
- ■ 2.1 to 2.7
- ■ 2.8 to 3.2
- ■ 3.3 to 3.5
- ■ 3.6 to 4.3
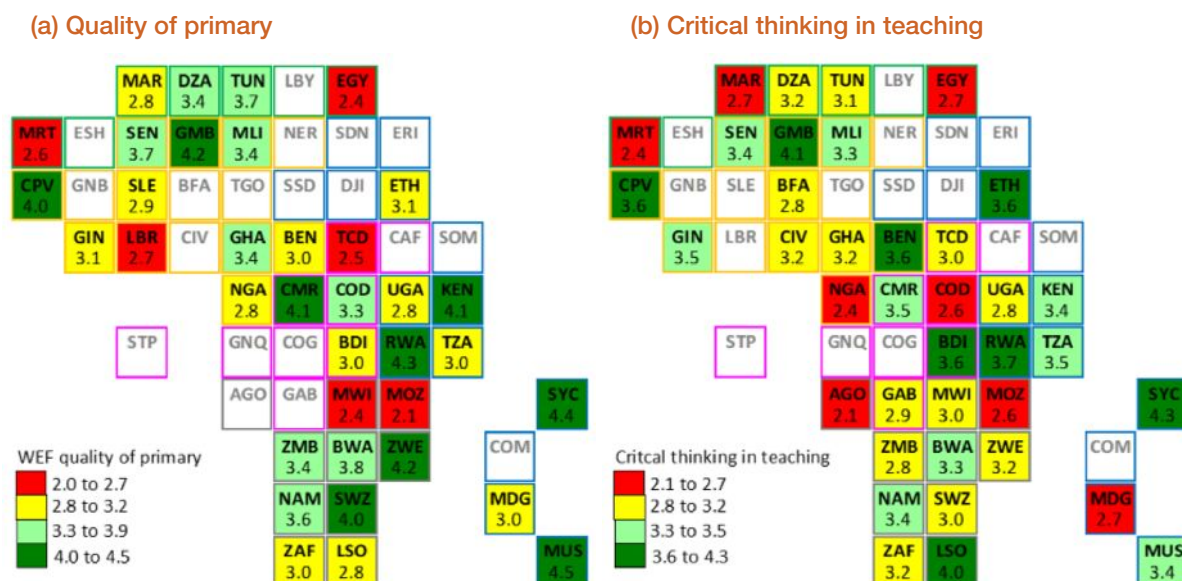
Source: World Economic Forum (2017) and World Economic Forum (2019)

4.6. Adult literacy rates

The SDGs monitor adult literacy through indicator 4.6.1, which reads as follows:

> *Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex*

UIS.Stat provides statistics for this indicator for age 15 and above, and ages 15 to 24.[63] High levels of adult literacy are largely presumed to be the product of effective schooling when adults were children. Adult literacy rates may thus be expected to reflect proficiency levels and school participation experienced by children over several decades.

Values in Figure 25 draw from the UIS literacy statistics for ages 15 to 24, both sexes combined.[64] There are values for 49 of the 55 African countries. In developing countries, adult literacy statistics are nearly all based on household surveys that ask adults about their level of literacy without conducting a literacy test.[65] Youth literacy appears highest in the south and north of the continent.

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[63] The values for ages 15 to 24 fall under the heading 'Youth literacy rate', with the indicator numbered 4.6.2. This indicator is listed as one of the second-tier 'thematic indicators' in UIS (2017, p. 15).

[64] The indicator from which values are drawn is referred to as indicator 4.6.2 in UIS.Stat.

[65] See 'General metadata on literacy rate' on UIS.Stat.

Figure 25: Harmonized test scores
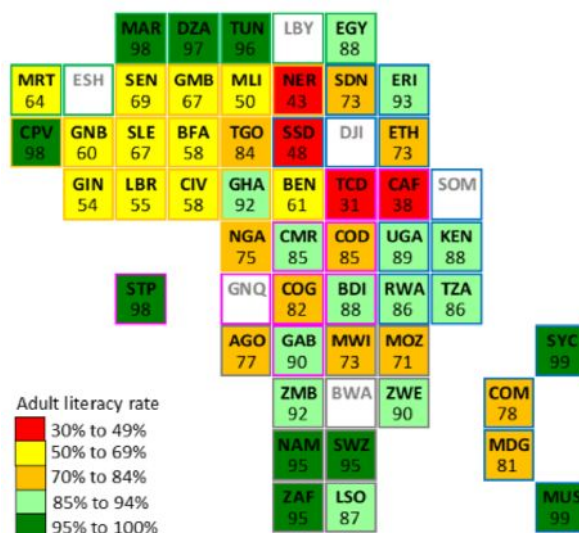
Source: UIS.Stat retrieved September 2021.

4.7. Degree of consistency across indicators

Examining correlations across the various series of values discussed thus far can help guide their use and interpretation. Table 6 provides correlation coefficients. In the case of the SDG 4.1.1 indicator values, the most recent one for each country in each series was selected. A correlation coefficient of .70 or more can be considered high. The signs of the correlations between the two World Bank indicators – learning poverty and learners below a minimum reading threshold – and all other indicators were switched so that a high positive correlation always represents the ideal. The two World Bank indicators are the only ones for which a higher value represents lower proficiency. The colours in Table 6 illustrate how many countries produce the correlation statistic (precise numbers are provided in Appendix 2).

Table 6: Correlations across different measures of basic education in Africa

Variables	S LPR	S EPR	S LSR	S LPM	S EPM	S LSM	WP	WS	HTS	SACMEQ	MICS R	MICS M	WEF Q	WEF C
S EPR	0.28													
S LSR	-0.89	0.53												
S LPM	0.83	0.06												
S EPM	0.16	0.65	0.46	-0.26										
S LSM	-0.88	0.61	0.94		0.45									
WP	0.33	0.78	0.51	0.27	0.09	0.4								
WS	0.33	0.77	0.65	0.31	0.06	0.53	0.99							
HTS	0.53	0.54	0.12	0.34	0.23	0.19	0.61	0.61						
SACMEQ	0.82			0.88			0.92	0.91	0.8					
MICS R	0.45	-0.38		-0.62	0.06		0.85	0.84	0.48					
MICS M	0.3	-0.2		-0.38	-0.06		0.87	0.83	0.07		0.76			
WEF Q	0.05	0.25	-0.64	-0.03	-0.01	-0.36	0.36	0.41	0.5	0.73	0.34	0.23		
WEF C	-0.02	0.11	-0.18	-0.06	0.19	-0.13	0.03	0	0.41	0.55	-0.05	-0.12	0.56	
YOUTH	0.12	0.32	0.19	-0.26	0.29	0.18	0.34	0.28	0.44	0.68	0.6	0.42	0.44	0.1

Note and sources:
S EPR: SDG 4.1.1 for end-of-primary (EP) reading (R), etc. LP is lower primary, LS is lower secondary and M is mathematics. WP: World Bank-UIS learning poverty; WS: World Bank learners below a reading threshold. HTS: Harmonized test scores. SACMEQ: SACMEQ 2013 reading mean scores. MICS R: MICS reading; MICS M: MICS mathematics. WEF Q: WEF quality of primary schooling; WEF C: Critical thinking in teaching. YOUTH: Adult literacy rate for ages 15 to 24.

The six SDG proficiency indicators (lower primary reading is on the horizontal axis) produce high correlation coefficients when different subjects are compared across the same primary level. In other cases, correlations are often weak and underpinned by few countries, as discussed in Section 2.2..

Turning to correlations between the SDG indicator values and non-SDG values, a few patterns stand out. SACMEQ correlates well with the SDG indicators, though SACMEQ was not used for any of the SDG values. However, the overlap consists of just five countries. The World Bank's learning poverty values correlate well with end-of-primary reading in the SDGs, but this is in part because the two use the same PASEC data source. PASEC has not been entered separately in Table 6 as PASEC values are incorporated within the SDGs. The MICS reading values do not correlate strongly with SDG lower primary reading, the coefficient being .45. This low correlation is driven by the fact that of the ten countries considered, Togo, Chad and the Democratic Republic of the Congo carry PASEC values for the SDG, though they also have MICS values, and for these three countries the correlation is very weak. For MICS mathematics, the correlation with the corresponding SDG indicator is negative at -.38. The WEF values are never well correlated with the SDG values, as might be expected given how the WEF values are derived.

Turning to correlations among non-SDG series, the harmonized test scores and learning poverty values, both from the World Bank, display a medium correlation of .61. SACMEQ correlates strongly with these two World Bank series, but that is partially because these two series use SACMEQ. What is said of SACMEQ here also applies to the MICS. While the two WEF series do not correlate poorly with each other, they correlate poorly with almost every other, though the correlation between the WEF values and SACMEQ is not low.

Youth literacy rates correlate relatively well with SACMEQ and MICS reading values. The conclusion one can draw is that there is much work to be done to strengthen the monitoring of fundamental human capabilities in Africa. As Table 3 suggests, correlations of .90 and above can be considered possible and a goal in this type of analysis, certainly when the same level of education is being considered, but even across different levels of the schooling system. Table 7 shows where the countries' rankings change markedly across two different series of

values. As above, the most recent SDG 4.1.1 proficiency value for each country was selected. The two WEF series and the World Bank's indicator on learners reaching a reading threshold were not included in the analysis, though the World Bank-UIS's learning poverty measure was. Only large ranking discrepancies of 15 places or more are reported here. For example, Burundi is ranked first of 16 countries with respect to SDG 4.1.1 for lower primary mathematics but fifteenth among the 16 with respect to SDG 4.1.1 for end-of-primary reading – the 16 countries are those with values for either of the two series. This was, as seen in Section 2.2.. But the additional information provided by Table 7 reveals that when the SDG end-of-primary reading values are compared to the harmonized test scores, here, too, Burundi sees a large ranking discrepancy, with the ranking in the SDG series being at least 15 places lower than the ranking in the harmonized series. This finding strengthens the possibility that Burundi's end-of-primary reading value is unreliable. In fact, Burundi exhibits discrepancies in many of the comparisons illustrated in Table 7. Discrepancies for many countries emerge when comparisons are made against youth literacy. This is to be expected given how youth literacy is generally measured. South Africa's adult literacy rate is higher than one might expect given the performance of children in assessments. In contrast, reported adult literacy rates for Niger and Benin appear low relative to what children achieve.

Table 7: Countries with large ranking discrepancies in two-way comparisons

	S EPR	S LPM	WP	HTS	YOUTH
S LPR	BDI		BDI	NER	GHA ZAF ZWE NER
S EPR		BDI		BDI	
S LPM				LSO COD NER	GHA LSO ZAF ZWE NER TCD
S EPM				ETH	
WP				BDI	COD BEN
HTS					COD DZA EGY GHA MAR NGA ZAF ZMB BEN BFA CAF GIN SEN

Note: Red means the series represented by the row heading produces a ranking for the country that is at least 15 places lower than the series represented by the column heading. The opposite applies if the country appears in black. ISO country codes are provided in Appendix 1. For this analysis, the complement of the World Bank's poverty score (one minus this value) was used, meaning for instance that 35% would become 65%.

When indicators represent a percentage of people reaching some desired education level, it is useful to compare the means across the indicators. This is what Table 8 does. Boxed values represent comparisons across SDG indicators where the row heading represents a higher level of education than the column 'heading' (or footer – labels appear at the bottom of the table). The fact that all these boxed values are negative is consistent with a pattern in which reported proficiency drops as children reach higher levels in the schooling system.

Section 4.3 indicated that only 20% of Africa's learners in schools are proficient in reading at the end of the primary level, according to the World Bank-UIS's learning poverty accounting system. As shown in Table 2, this statistic points to a higher percentage of proficiency, at 31%, when SDG 4.1.1 values are considered. Table 8 points to a difference between the complement of the World Bank's reading poverty value (one minus this value) and the SDG 4.1.1 end-of-primary reading value of eight percentage points, with the SDG value being higher. This difference uses the same countries in both series and does not weight by child populations. It reflects mainly differences in the data sources, but also differences in the criteria used to consider learners proficient and the statistics that are sufficiently reliable for inclusion within the series.

It is clear from the table that youth literacy rates tend to be much higher than proficiency rates for children, by 30 to 70 percentage points. This is even true when secondary-level learners are compared to adults: On average, youth literacy rates are 64 percentage points higher than reading proficiency levels at the lower secondary level, as

reflected by SDG 4.1.1. This confirms the greater stringency applied to the testing of learners but is also indicative of the fact that literacy is to some extent improved outside of schooling.

Table 8: Comparison of proficiency levels across series in Africa

	S LPR	S LPM	S EPR	S EPM	S LSR	S LSM	WP	MICS R	MICS M
S LPM	11								
S EPR	-13	-33							
S EPM	-26	-45	-11						
S LSR	-14	-21	-18	-14					
S LSM	-18	-25	-26	-19	-6				
WP	-18	-38	-8	3	-1	6			
MICS R	-9	-16	-5	-1	19	22	1		
MICS M	-16	-20	-7	-4	-13	-10	-8	-6	
YOUTH	42	31	43	54	64	69	53	62	68

Note: Values indicate how much higher the average level is in the series represented by the row heading compared to the series represented by the column heading. Green means a difference is positive. Values are in boxes for comparisons across SDG indicators when the row heading represents a higher level of schooling than the column. The complement of the World Bank's poverty score was used for this analysis. In this table, there is no minimum restriction on the number of countries included in the comparison.

Concerning Table 8, it is also noteworthy that MICS proficiency statistics are relatively low. For instance, MICS reading proficiency levels are nine percentage points lower than SDG 4.1.1 lower primary reading levels, though the latter include some values from the former.

5. Current estimates of the impact of the 2020 pandemic on proficiency

The great majority of statistics referred to in this report were collected prior to the onset of the COVID-19 pandemic in 2020. The full impact of the pandemic on SDG 4.1.1 indicators and learning in general will only be understood some years from now. However, evidence has already begun to emerge on the important relationship between learners' losses in contact time and learning losses. Losses in contact time are fairly easily accounted for, though even here measurement problems exist. Official rules around school closures and openings may not reflect changes in contact time reliably in a context where teachers have fallen ill, financial shocks in households have limited the possibility of sending children to school, and school timetables have been rearranged to promote social distancing.

The UIS (2021c), [p.36] reported that by November 2020, most African countries had lost 35% to 54% of a school year's worth of contact time as a result of the pandemic. These losses were slightly lower than losses seen in other parts of the developing world, such as Latin America and the Caribbean, and Central and Southern Asia. Based on the same methodology as the UIS (2021a),[66] by 15 July 2021 African children had lost 69% of a year of contact classes. The figure for the rest of the world was 95%. The values per African country are shown in Figure 26. It is clear that the variation in the official time lost is large, ranging from 11% of the school year lost in Burundi to 120% in Uganda. However, as mentioned earlier, these figures may not provide an entirely accurate picture of what in fact occurred during the period.

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[66] Specifically, the final method described in Section 6 of that report, which uses both UNESCO and OxCGRT data on school closures, was used. In this method, partial closures are counted as half. The 69% referred to here is weighted by country child populations.

Figure 26: Percentage of the school year lost due to COVID-19 up to 15 July 2021
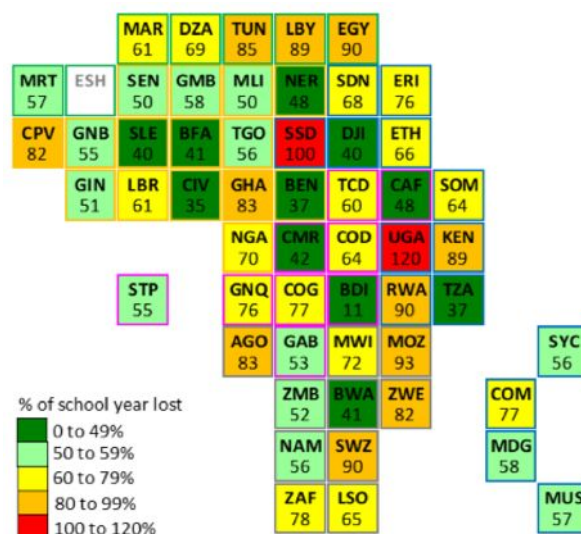
Time lost due to the pandemic is commonly converted into learning lost, expressed in terms of a year's worth of learning, using some ratio. The UIS (2021b) uses a ratio of 2.0, meaning that for every year of contact time lost, approximately two years of learning are lost. Time lost under-represents learning lost because the disruption to schooling tends to result in children losing skills they had acquired even before the disruption. The UIS (2021b) moreover estimates by what percentage proficient statistics have declined due to the pandemic and how quickly they might recover beyond the pandemic. The percentage of children in sub-Saharan Africa who are proficient in reading at the lower primary level was estimated to have declined from 20% just before the pandemic to 17% as a result of the pandemic,1 a decline of three percentage points. If this is recalculated to include all of Africa's 55 countries, the decline was from 24% to 20%, a four-percentage-point decline. Africa's decline is smaller than that for the rest of the world because the starting point was so low. But these figures hide serious educational losses experienced among the 76% who were below the internationally accepted proficiency threshold before the pandemic.

It will be important to acquire more evidence from Africa on the losses in learning proficiency to inform policy and budgeting as the continent embarks on its post-pandemic recovery. The ideal is to re-run some assessment conducted immediately before the pandemic, taking into account that learners being assessed could have changed, given that the pandemic has disrupted attendance in school and hence the availability of learners for testing. Published research on this premise for South Africa and Kenya currently exists and might provide guidance for future analyses of this kind.

Two South African papers suggest that as much as 76% of a year's worth of learning was lost with respect to Grade 4 reading, in a context where around 60% of contact time was lost.1 These findings indicate that learning losses were around 25% higher than losses in contact time. Importantly, the 'learning loss' was not such that learners scored worse on average than they did before the pandemic. Roughly, their scores remained unchanged, but they should have gained skills through schooling during this time. The learning loss is thus relative to where they would have been had there been no pandemic. Learners' socio-economic background was used to gauge whether there were substantial differences in the composition of learners being tested, and such differences were not found.[67]

An analysis of learning in the context of COVID-19 in Kenya[68] found that the mathematics skills of learners in grades 4 to 8 declined compared with where they were before the pandemic. Here the learning loss was thus an absolute loss of learning, not a relative loss. On average, learners lost around 30% of a year's worth of learning. This means they were more than 30% of a year behind in mathematics relative to where they should be after a year, the period between the initial pre-pandemic testing and the testing during the pandemic having been around

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[67] Ardington 2021.
[68] Whizz Education 2021.

a year. The authors of the Kenya analysis indicate that the effects of the pandemic may have been even worse than what they report as the learners sampled displayed above-average levels of motivation.

6.Existing monitoring systems

Improving the monitoring of learning proficiency in Africa means in part building on what monitoring mechanisms already exist. The 30 countries that appear as coloured-in boxes in Figure 27 have each participated in at least one international assessment programme at the primary level since 2010. These programmes, by pooling resources and facilitating comparisons across countries, are particularly effective for achieving relevant and sufficiently rigorous monitoring of proficiency levels and proficiency trends. As discussed previously, not all these programmes have reached their full potential. Still, they are a good point of departure. The 30 countries account for 50% of Africa's children.

Figure 27: Participation in international assessments at the primary level
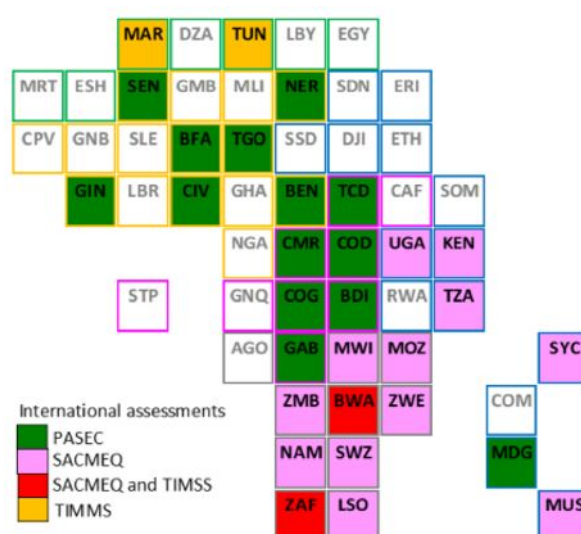
Sources: Publications and websites of the four assessment programmes.

Figure 27, refers only to assessments at the primary level, as detecting learning proficiency gaps at this level is especially important for the planning of improvements. At the secondary level, four countries have participated in TIMSS: Egypt, Ghana, Botswana and South Africa. Moreover, five countries have participated in the OECD's PISA programme: Algeria, Tunisia, Mauritius, Senegal and Zambia.[69]

Taking stock of what learning assessments exist in Africa is an important task in itself, apart from using the information such assessments generate. The UIS published its first Database of Learning Assessments, reflecting the global situation, in 2015.[70] This data collection exercise was repeated, and the results of a new wave of surveys are expected to be released in 2021. Figure 28 draws on the pre-published version of this database to illustrate the use, in the period since 2010, of the Early Grade Reading Assessment[71] (EGRA) and the Early Grade Mathematics Assessment (EGMA). These assessments do not result in reports with the level of cross-country comparability of, for instance, the MICS described in Section 4.2, but they are nonetheless important tools for building national capacity around the collection of statistics on proficiency.
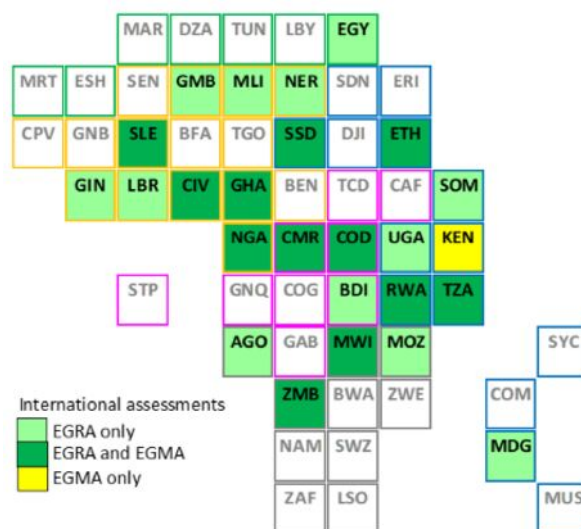
69   Senegal and Zambia have participated in PISA for Development.
70   http://uis.unesco.org/en/uis-learning-outcomes
71   Kim et al. 2016.

Figure 28: Participation in EGRA and EGMA

Sources: Publications and websites of the four assessment programmes.

National assessments assist in monitoring learning proficiency, and some national assessments feed into official SDG 4.1.1 indicator values. However, they are more susceptible to undue influence by national education authorities than international assessments and are often limited by the level of technical capacity in the country in question. Advantages include the fact that they can be designed to monitor country-specific curriculum and language issues. UNESCO has advocated for the development of national assessments across all countries.[72]

Figure 29, like Figure 28, makes use of recent data on learning assessments collected by the UIS. In Figure 29, national assessments at the primary level that were in use at some point in the period from 2016 to 2020 are reflected. The ideal was considered a sample-based assessment programme as such programmes are best at producing reliable data, in particular on trends over time. This is because the only accurate way of gauging trends is to repeat whole tests, or parts of tests, across different years while keeping tests secure, or secret.[73] Test security is very difficult in a testing system where all learners take the test. If sample-based systems from Figure 29 are viewed jointly with international programme coverage (Figure 27), the finding is that 34 countries already have a system in place that can, perhaps with modifications, monitor proficiency in terms of the SDG 4.1.1 indicator at the primary level. The 34 countries represent 78% of Africa's children.

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72   UNESCO 2005, p.90.
73   UIS 2018.

Figure 29: Presence of national assessments at the primary level
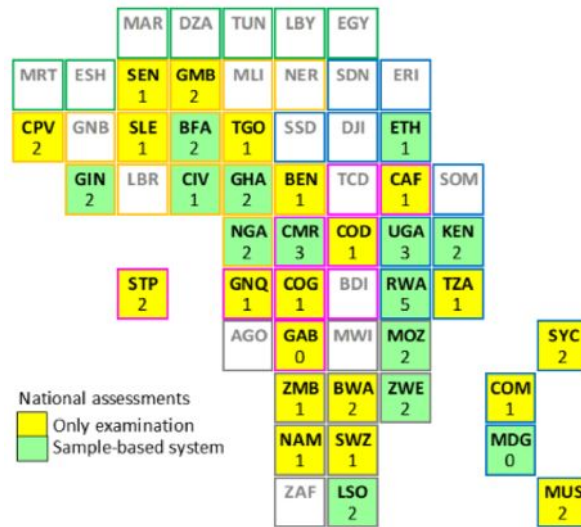
Source: Pre-published Inventory of Learning Assessments database, July 2021 version.

Note: For the purposes of this diagram, any universal assessment, or assessment not using a sample, is considered an 'examination'.

7.Recommendations for future monitoring

The Introduction explained why it is important for countries across Africa to monitor whether children reach minimum proficiency levels. While national statistics are important, they are just one element in any national monitoring system. Such systems often include elements that enhance comparability across countries and over time and allow for statistics at a subnational level.

As the UIS has discussed (2018), there are important trade-offs between the reliability of data and the extent of data collection. Learner assessment systems that cover all learners in a specific grade within a country are useful for facilitating action with respect to specific schools, as information is produced for every school. However, the information from such universal, or censal, systems tends to be less reliable than information on learning proficiency from sample-based assessments, which permit more rigorous controls in the test administration process and facilitate the security of test items, or questions, which are repeated in later years. This explains the strong emphasis on sample-based systems in reporting against the SDG 4.1.1 indicator. Yet for national governments universal assessment systems, which include examination systems, are important for various reasons. The recommendations that follow deal mainly with sample-based assessments systems, but they acknowledge to some extent the national need to focus on both types of assessment.

The recommendations draw in part on three earlier reports dealing with global challenges:

- The UIS (2018) examines the costs and benefits associated with different ways of tracking progress towards universal proficiency among children.

- UNESCO (2018) explains the importance of data for planning progress within the education sector in terms of SDG 4.

- UNESCO (2019) explains the opportunities and risks associated with national and international testing systems.

The objective here is not to repeat the recommendations from these earlier documents, but to draw from the analysis presented in the current report to identify special challenges of relevance to planners and stakeholders in Africa, whether at the national, subnational or supranational level. Recommendations are grouped under four themes:

1. **Measurement within existing indicator definitions must be improved. The AU has not introduced its own set of indicators to monitor learning proficiency but has instead focused on the relevant SDG indicators.** This seems an optimal approach. As shown in this report, SDG indicator 4.1.1 is relevant for monitoring learning in Africa. The key challenges lie in data collection and data use, and these are areas where the AU, and African countries, should invest human and financial resources. For practical purposes, SDG 4.1.1 has been implemented as an indicator of proficiency among learners, not the population, though levels of proficiency in the population are what SDG 4.1 is concerned with. SDG 4.1.1 indicator values on proficiency among learners should ideally be accompanied by estimates of proficiency in the population, using out-of-school statistics. A further complexity that is important but hardly ever taken into account in reporting is the influence of grade repetition on proficiency statistics.1 Relatively high numbers of out-of-school children and high rates of grade repetition in many countries in Africa make adjustments catering for these issues especially important.

2. **Africa should focus on the development of the two African assessment programmes, PASEC and SACMEQ**. These programmes cover 28 countries representing around 48% of the continent's children. Investment in these programmes benefits the 28 countries directly, but also serves to build assessment capacity on the continent more broadly, thus benefiting all of Africa. Among the types of investment needed, a greater number of analysts, and certainly analysts from all countries participating in the two programmes, need to be familiar with the data and methods. This will facilitate further analysis, bearing in mind that the knowledge that has so far been generated using the data, while important, is a small fraction of what could be generated. A variety of analysts, approaching the data from different angles, will help bringing measurement problems to the fore. Both PASEC and SACMEQ are relatively young assessment programmes and have been experiencing, and should continue to experience, an ongoing process of development and improvement.

3. **A sense of national ownership of SDG 4.1.1 statistics needs to be cultivated.** Currently, countries do not report on proficiency in the manner they report on other education indicators, such as enrolment and teacher numbers. This is in part due to limited capacity in many countries to produce reliable statistics on proficiency, and the fact that results from international testing systems have in many cases been readily available. However, countries should ideally be involved in the various steps, including decisions around what statistics should be used where there is more than one data source, and when statistics can be considered sufficiently reliable. Moreover, whether to use international programmes or national assessments that include elements facilitating international comparison for the purposes of SDG proficiency statistics is a question countries should be directly involved in, according to clear protocols. Incorporating such additional data would not detract from the role of the UIS as a quality assurer of statistics officially reported within the SDG system; indeed, how countries, regional bodies such as the AU and global bodies such as the UIS collaborate is currently fairly fluid. The right kind of formalization could enhance this collaboration. Now is a good time to proceed with this process. Although much work has been done, the process of monitoring the proficiency of children remains a new area with space for innovation. This is evident in the fact that, for instance, only 14 of 55 African countries currently have proficiency trend data in the SDG system, and only 7% of all possible proficiency values have been reported on in recent years.

4. **Holistic monitoring of learning drawing from all available data sources is necessary.** While some data are clearly more suitable for SDG 4.1.1 reporting purposes, a country's approach to tracking proficiency should be broad and make use of any data that can help to understand learning. For example, analysis of data on examinations can help to translate SDG proficiency benchmarks to standards widely understood by schools and teachers. Citizen-led household surveys2 conducted by non-government organizations can help to raise awareness of minimum proficiency standards at a local level and assist in the design of low-cost assessments capable of covering all schools. While data from such systems are unlikely to reach the quality standards required for SDG reporting, they are often sufficient to enhance the accountability of schools and school authorities to local communities. Reporting on the quality of schooling should encompass not just test results, which by their nature are limited, but also a focus on other areas, such as social values considered important in each country, and childhood nutrition.

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Appendix 1

Three-letter ISO1 codes for the 55 African countries are as follows:

AGO	Angola	**MAR**	Morocco
BDI	Burundi	**MDG**	Madagascar
BEN	Benin	**MLI**	Mali
BFA	Burkina Faso	**MOZ**	Mozambique
BWA	Botswana	**MRT**	Mauritania
CAF	Central African Republic	**MUS**	Mauritius
CIV	Côte d'Ivoire	**MWI**	Malawi
CMR	Cameroon	**NAM**	Namibia
COD	Democratic Republic of the Congo	**NER**	Niger
COG	Congo	**NGA**	Nigeria
COM	Comoros	**RWA**	Rwanda
CPV	Cabo Verde	**SDN**	Sudan
DJI	Djibouti	**SEN**	Senegal
DZA	Algeria	**SLE**	Sierra Leone
EGY	Egypt	**SOM**	Somalia
ERI	Eritrea	**SSD**	South Sudan
ESH	Western Sahara	**STP**	Sao Tome and Principe
ETH	Ethiopia	**SWZ**	Eswatini
GAB	Gabon	**SYC**	Seychelles
GHA	Ghana	**TCD**	Chad
GIN	Guinea	**TGO**	Togo
GMB	Gambia	**TUN**	Tunisia
GNB	Guinea-Bissau	**TZA**	United Republic of Tanzania
GNQ	Equatorial Guinea	**UGA**	Uganda
KEN	Kenya	**ZAF**	South Africa
LBR	Liberia	**ZMB**	Zambia
LBY	Libya	**ZWE**	Zimbabwe
LSO	Lesotho		

Appendix 2

The table below provides the exact numbers of countries behind each correlation coefficient in Table 6 in Section 4.7.

	S LPR	S EPR	S LSR	S LPM	S EPM	S LSM	WP	WS	HTS	SACMEQ	MICS R	MICS M	WEF Q	WEF C
S EPR	16													
S LSR	3	4												
S LPM	24	16												
S EPM	16	18	4	16										
S LSM	3	4	7		5									
WP	17	17	6	16	18	7								
WS	17	17	6	16	18	7	23							
HTS	25	18	7	24	19	8	23	23						
SACMEQ	5			5			3	3	12					
MICS R	10	4		9	4		5	5	11					
MICS M	10	4		9	4		5	5	11		13			
WEF Q	19	12	7	18	13	8	17	17	35	12	9	9		
WEF C	21	15	7	20	16	8	20	20	37	12	8	8	34	
YOUTH	25	18	7	24	19	8	22	22	45	11	13	13	35	37

Appendix 3

List of acronyms

AU	African Union
CESA	Continental Education Strategy for Africa
CONFEMEN	Conférence des ministres de l'Éducation des États et gouvernements de la Francophonie
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
MICS	Multiple Indicator Cluster Surveys
PASEC	Programme d'Analyse des Systèmes Educatifs de la CONFEMEN
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
SDG	Sustainable Development Goal
TIMMS	Trends in International Mathematics and Science Study
UIS	UNESCO Institute for Statistics
WDI	World Development Indicators
WEF	World Economic Forum