SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.1.1 Proportion of children and young people (a) in Grade 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

Definition
Percentage of children and young people achieving at least a minimum proficiency level (MPL) in (i) reading and (ii) mathematics during primary education (Grade 2 or 3), at the end of primary education, and at the end of lower secondary education.

Purpose
The indicator aims to measure the percentage of children and young people who have achieved the minimum learning outcomes in reading and mathematics during or at the end of the relevant stages of education.

Calculation method
The number of children and/or young people at the relevant stage of education $n$ in year $t$ achieving or exceeding the pre-defined proficiency level in subject $s$ expressed as a percentage of the number of children and/or young people at stage of education $n$, in year $t$, in any proficiency level in subject $s$.

$$\text{MPL}_{t,n,s} = \frac{\text{MP}_{t,n,s}}{\text{Pt,n}}$$

where:
- $\text{MP}_{t,n,s}$ = the number of children and young people at stage of education $n$, in year $t$, who have achieved or exceeded the minimum proficiency level in subject $s$.
- $\text{Pt,n}$ = the total number of children and young people at stage of education $n$, in year $t$.
- $n$ = the stage of education that was assessed.
- $s$ = the subject that was assessed (reading or mathematics).
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Interpretation
The higher the value of the indicator, the higher the proportion of children or young adults who have acquired the minimum level of meaningful competencies.

Type of data source
The sources of data are:

i. International assessments

ii. Regional assessments

iii. National assessments data collected through the Catalogue of Learning Assessments (CLA) and/or available in national reports

iv. Population-based assessments:
   a. Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA)
   b. UNICEF Multiple Indicator Cluster Surveys (MICS)
   c. People's Action for Learning (PAL) NETWORK (e.g. Annual Status of Education Report (ASER), UWEZO, etc.)

When the results are not nationally representative, a footnote should be added to the data point.

Disaggregation
Indicator is published disaggregated by sex and completion status (Global Indicator 4.1.2).

Other disaggregation such as location, socio-economic status, immigrant status, ethnicity and language of the test at home are based on data produced by international organizations administering cross learning assessment. Parity indexes are estimated in the reporting of Indicator 4.5.1. Information on the disaggregation of variable for Indicator 4.1.1 are presented in the tables in Annex I.
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As indicated in the metadata of SDG indicator 4.1.2, the completion rate can be used in combination with SDG indicator 4.1.1 to provide information on the percentage of children or young people in a cohort who achieve a minimum level of proficiency (MPL), and not only on the percentage of children in school who achieve minimum proficiency. Therefore, to reflect the percentage of all children and/or young people who have achieved the minimum level of proficiency and comply with the commitment to leave no one behind, Indicator 4.1.1 can also be disaggregated by the status of completion. However, the information on the percentage of children and/or young people who have reached minimum proficiency does not tend to be available, even though they have left school before reaching the end of primary and lower secondary education, respectively.

Considering that the emphasis of Target 4.1 is to ensure that all boys and girls ‘complete ... education leading to relevant and effective learning outcomes,’ it can be assumed that no children and/or young people who have left school before completing primary or lower secondary education have reached the minimum proficiency level expected at that level of education. As a result, the disaggregation by completion status takes the following form:

**Indicator 4.1.1 disaggregated by completion** \( t, n, s \) =  
\[ \text{Indicator 4.1.2}_{t,n} \times \text{Indicator 4.1.1}_{t,n,s} \]

where:

- **Indicator 4.1.2\(_{t,n}\)** = percentage of a cohort of children or young people aged 3-5 years above the intended age for the last grade of each level of education \( n \) who have completed that grade, in year \( t \), and achieved or exceeded the minimum proficiency level in subject \( s \).

- **Indicator 4.1.1\(_{t,n,s}\)** = proportion of children and young people at stage of education \( n \), in year \( t \), achieving at least a minimum proficiency level in subject \( s \).

- \( n \) = the stage of education that was assessed
- \( s \) = the subject that was assessed (reading or mathematics).

**Methodological challenges**

The indicator faces the following methodological challenges:

i. Define a minimum proficiency level (MPL)

ii. Harmonize various data sources, including non-official data sources

iii. Define how to include non-completers to assess their level of proficiency

**i. Definition of the Minimum Proficiency Levels**

A minimum proficiency level (MPL) is the benchmark of basic knowledge in a domain (mathematics, reading, etc.) measured through learning assessments. The minimum proficiency level is measured through the definition agreed in 2018 and was refined in 2020.

To ensure comparability across learning assessments, a verbal definition of MPL for each domain and levels between cross-national assessments (CNAs) was established by
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conducting an analysis of the performance level descriptors (PLDs) of cross-national, regional, and community-led tests in reading and mathematics. The analysis was led and completed by the UIS and a consensus among experts on the proposed methodology was deemed adequate and pragmatic.

The global MPL definitions for the domains of reading and mathematics are presented in Table 1.

Table 1. Minimum proficiency levels defined by each learning assessment

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading</strong></td>
<td></td>
</tr>
<tr>
<td>Grade 2</td>
<td>They read and comprehend most of written words, particularly familiar ones, and extract explicit information from sentences.</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Students read aloud written words accurately and fluently. They understand the overall meaning of sentences and short texts. Students identify the texts' topic</td>
</tr>
<tr>
<td>Grades 4 &amp; 6</td>
<td>Students interpret and give some explanations about the main and secondary ideas in different types of texts. They establish connections between main ideas on a text and their personal experiences as well as general knowledge.</td>
</tr>
<tr>
<td>Grades 8 &amp; 9</td>
<td>Students establish connections between main ideas on different text types and the author's intentions. They reflect and draw conclusions based on the text.</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
</tr>
<tr>
<td>Grades 2-3</td>
<td>Students demonstrate skills in number sense and computation, shape recognition and spatial orientation.</td>
</tr>
<tr>
<td>Grades 4-6</td>
<td>Students demonstrate skills in number sense and computation, basic measurement, reading, interpreting, and constructing graphs, spatial orientation, and number patterns.</td>
</tr>
<tr>
<td>Grades 8 &amp; 9</td>
<td>Students demonstrate skills in computation, application problems, matching tables and graphs, and making use of algebraic representations.</td>
</tr>
</tbody>
</table>

ii. Harmonization of data sources

To address the challenges posed by the limited capacity of some countries to implement cross-national, regional, and national assessments, actions have been taken by the UIS and its partners. The UIS has proposed some options to link assessments together; one of these strategies is the Rosetta Stone, a subject-based psychometric linking approach (new data
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collection). The second one is the Policy linking approach, which consists on setting benchmarks, or cut scores, on learning assignments to align them with other assessments across countries or contexts (alignment with existing data).

The objective of the Rosetta Stone is to link together assessments, which have been administered in the recent past, to build concordance tables to compare their outcomes and benchmark national results to those of the regional assessments. This method enables countries to measure Sustainable Development Goal (SDG) 4 Indicator 4.1.1.

The Policy linking method makes use of a standard-setting methodology (the Angoff approach for those familiar with standard setting methodologies), long used in many countries, to set benchmarks (also known as “cut scores” or “thresholds”) on learning assessments. While it is an old standard-setting methodology, the UIS and its partners have now extended its use to help countries set benchmarks using the Global Proficiency Framework (GPF) for reading and for mathematics, a framework developed by multilateral donors and partners based on current national content and assessment frameworks across more than 100 countries. The GPF provides performance expectations/standards for learners in Grades 2-9 in reading and mathematics. By linking their national assessments to the GPF, countries and donors are able to compare learning outcomes across language groups in countries as well as across countries and over time, assuming all new assessments are subsequently linked to the GPF. Policy linking allows countries to use their existing national assessments or early grade reading and mathematics assessments to report against Indicator 4.1.1.

It is possible for countries to report on Indicator 4.1.1 using national learning assessments (NLA) provided that they comply with the Protocol for reporting Indicator 4.1.1.

iii. Completion status

Combining completion rates with learning outcomes improves our understanding of progress towards Target 4.1. Almost all information regarding learning is school-based and does not consider the completion of the level. The inclusion of completion in the global list offers an opportunity to report according to the completion status. The greatest differences between the SDG 4.1.1 on learning before completion and the disaggregation by completion are found in regions or countries with lower completion and enrolment rates (or children completing and learning) because the adjusted indicator is based on a quality-adjusted completion rate. This also explains why the largest differences occur at the lower secondary level. Globally, 47% of lower secondary students achieve minimum proficiency in reading according to the original SDG 4.1.1 Indicator, but the value for the adjusted indicator would fall to 34% of adolescents completing lower secondary and achieving minimum proficiency in mathematics. See references here.
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Protocol for reporting Indicator 4.1.1
In reporting on Indicator 4.1.1, questions may arise in relation to:
- Which content should be measured and what is the percentage of coverage to be covered by a given assessment to be comparable to other assessments?
- What procedures are good enough to ensure quality of the data collected?
- A proficiency scale where all assessments could be informed (and its conversion function or the linking procedure), and a definition of the minimum level for each domain that would allow the estimation of the percentage of students achieving the minimum proficiency level.

The Protocol for reporting Indicator 4.1.1 intends to provide answers to those questions.

Limitations and comments
Learning outcomes from cross-national learning assessment are directly comparable for all countries which participated in the same cross-national learning assessments. However, these outcomes are not comparable across different cross-national learning assessments or with national learning assessments. A level of comparability of learning outcomes across assessments could be achieved by using different methodologies, each with varying standard errors. The period of 2020-2021 will shed light on the standard errors' size for these methodologies.

The comparability of learning outcomes over time has additional complications, which require, ideally, to design and implement a set of comparable items as anchors in advance. Methodological developments are underway to address comparability of assessments outcomes over time.
### ANNEX I

<table>
<thead>
<tr>
<th>Sex</th>
<th>Assessment</th>
<th>Definition</th>
<th>Metrics</th>
<th>Categories</th>
<th>Item and component description</th>
<th>Parity index (API)</th>
<th>Relevant link</th>
</tr>
</thead>
<tbody>
<tr>
<td>PISA</td>
<td>Sex of students</td>
<td>Nominal</td>
<td>2</td>
<td>Are you female or male?</td>
<td>Female Male</td>
<td><a href="https://www.oecd.org/pisa/data/CY6_QST_MS_STQ_CBA_Final.pdf">https://www.oecd.org/pisa/data/CY6_QST_MS_STQ_CBA_Final.pdf</a></td>
<td></td>
</tr>
<tr>
<td>LLECE</td>
<td>Sex of students</td>
<td>Nominal</td>
<td>2</td>
<td>Usted es niño o niña?</td>
<td>Niña Niño</td>
<td><a href="https://unesdoc.unesco.org/ark:/48223/pf0000243533">https://unesdoc.unesco.org/ark:/48223/pf0000243533</a></td>
<td></td>
</tr>
<tr>
<td>PILNA EGRA, EGMA, MICS</td>
<td>Sex of students</td>
<td>Nominal</td>
<td>2</td>
<td>Are you a girl or a boy?</td>
<td>Girls Boys</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.1 Proportion of children and young people (a) in Grade 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

<table>
<thead>
<tr>
<th>Location</th>
<th>Assessment</th>
<th>Definition</th>
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<th>Parity index (API)</th>
<th>Relevant link</th>
</tr>
</thead>
<tbody>
<tr>
<td>PILRS TIMSS</td>
<td>School location declared by the principal</td>
<td>Nominal</td>
<td>5</td>
<td></td>
<td>Which best describes the immediate area in which your school is located? Urban-Densely populated, Suburban-on fringe or outskirts of urban area, Medium size city or large town, Small town or village, remote rural</td>
<td>Remote rural Urban Densely populated</td>
<td><a href="https://timssandpirls.bc.edu/pirls2016/questionnaires/downloads/P16_SchQ.pdf">https://timssandpirls.bc.edu/pirls2016/questionnaires/downloads/P16_SchQ.pdf</a> <a href="http://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_SchQ_4.pdf">http://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_SchQ_4.pdf</a></td>
</tr>
<tr>
<td>PISA</td>
<td>School location declared by the principal</td>
<td>Nominal</td>
<td>5</td>
<td></td>
<td>Which of the following definitions best describes the community in which your school is located? A village, hamlet or rural area (fewer than 3,000 people), A small town (3,000 to about 15,000 people), A town (15,000 to about 100,000 people); A city (100,000 to about 1,000,000 people); A large city (over 1,000,000 people)</td>
<td>Rural area City</td>
<td><a href="https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_SCQ_NoNotes_final.pdf">https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_SCQ_NoNotes_final.pdf</a></td>
</tr>
<tr>
<td>PASEC</td>
<td>School location declared by the principal</td>
<td>Nominal</td>
<td>4</td>
<td></td>
<td>Votre école est située dans.? Une ville, Une banlieue de grande ville, Un grand village (plusieurs centaines de concessions), Un petit village (plusieurs dizaines de concessions)</td>
<td>Un petit village Une ville</td>
<td><a href="http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCEQUESTIONNAIRE_VF.pdf">http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCEQUESTIONNAIRE_VF.pdf</a></td>
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<tr>
<th>Location</th>
<th>School location declared by the principal</th>
<th>Nominal</th>
<th>5</th>
<th>Su escuela se encuentra en una localidad de: 2.000 habitantes o menos, Entre 2.001 y 5.000 habitantes, entre 5.001 y 10.000 habitantes, entre 10.001 y 100.000 habitantes, más de 100.000 habitantes</th>
<th>Rural/urban</th>
<th><a href="https://unesdoc.unesco.org/ark:/48223/pf000243533">https://unesdoc.unesco.org/ark:/48223/pf000243533</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE</td>
<td>School location declared by the principal</td>
<td>Nominal</td>
<td>5</td>
<td>Which of the following best describes the location of your school? Isolated, Rural, In or near a small town, in or near a large town or city</td>
<td>Rural/Urban (city)</td>
<td><a href="http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf">http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf</a>; <a href="http://www.sacmeq.org/sites/default/files/sacmeq/reports/sacmeq-iii/working-documents/wd01_sacmeq_iii_results_pupil_achievement.pdf">http://www.sacmeq.org/sites/default/files/sacmeq/reports/sacmeq-iii/working-documents/wd01_sacmeq_iii_results_pupil_achievement.pdf</a></td>
</tr>
<tr>
<td>SACMEQ</td>
<td>School location declared by the principal</td>
<td>Nominal</td>
<td>5</td>
<td>Is this considered an urban or a rural school? Urban, Rural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EGMA</td>
<td>School location declared by the principal</td>
<td>Nominal</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td><strong>Assessment</strong></td>
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<tr>
<td><strong>PISA</strong></td>
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<td><strong>LLECE</strong></td>
</tr>
<tr>
<td><strong>Indice de nivel socioeconómico de los estudiantes</strong></td>
</tr>
<tr>
<td>INSE is constructed from the information of the complementary questionnaires of parents or guardians. INSE is composed of the variables related to the mother's educational and work history, household income, housing goods and services, and the amount of books available.</td>
</tr>
<tr>
<td><strong>Quartiles</strong></td>
</tr>
<tr>
<td>Low quarter, Second quarter, Third quarter, High quarter</td>
</tr>
<tr>
<td>¿Cuál es el nivel educativo más alto que la madre del estudiante ha completado? Si la madre trabaja, señale aquella labor que más se parezca al trabajo que generalmente realiza; En un mes normal, ¿en cuál de los siguientes rangos se encuentra actualmente el ingreso total líquido del hogar donde vive el niño? ¿De qué material es la mayor parte de los pisos de su vivienda? ¿Cuenta con alguno de los siguientes servicios en su hogar? ¿Cuántos de los siguientes bienes tiene en su hogar? ¿Cuántos libros hay en la casa del niño? Considere todos los tipos de libro: poesía, novelas, diccionarios, libros de estudio, etc.</td>
</tr>
<tr>
<td><strong>Informe de resultados TERCE: Factores asociados.</strong></td>
</tr>
<tr>
<td>See: <a href="https://unesdoc.unesco.org/ark:/48223/pf0000243533">https://unesdoc.unesco.org/ark:/48223/pf0000243533</a></td>
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<th>Relevant link</th>
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<tbody>
<tr>
<td>SAQMEC</td>
<td>Index of the Socioeconomic Status (SES) of pupils</td>
<td>Quartiles</td>
<td>Low SES (25%)</td>
<td>Components: - the level of education of the father and mother, - the number of books in the home, - the presence of eleven items in the home (a newspaper, a magazine, a radio, a television, a VCR, an audio cassette player, a telephone, a refrigerator, a car, running water and a table), - the structural quality of the house (floor, outside walls and roof), - the main source of light, determining whether or not pupils can read.</td>
<td>Bottom quarter</td>
<td>See: <a href="http://www.sacmeq.org/sites/default/files/sacmeq/reports/sacmeq-iii/working-documents/wd01_sacmeq_iii_results_pupil_achievement.pdf">http://www.sacmeq.org/sites/default/files/sacmeq/reports/sacmeq-iii/working-documents/wd01_sacmeq_iii_results_pupil_achievement.pdf</a>; <a href="http://www.sacmeq.org/sites/default/files/sacmeq/research/Papers%20from%20the%202005%20International%20Invitational%20Educational%20Policy%20Research%20Conference/dolata.pdf">http://www.sacmeq.org/sites/default/files/sacmeq/research/Papers%20from%20the%202005%20International%20Invitational%20Educational%20Policy%20Research%20Conference/dolata.pdf</a></td>
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<tr>
<td>PIRLS TIMSS</td>
<td>Status declared by Students</td>
<td>Nominal</td>
<td>Country specific</td>
<td>1. Were you born (country)? 2. Was your child born in (country of test)? If, No, how old was your child when he/she came to (country of test)? Younger than 3 years old, 3 to 5 years old, 6 to 7 years old, 8 years old or older.</td>
<td>No Yes (native born)</td>
<td><a href="http://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_StuQ_IntSc_8.pdf">http://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_StuQ_IntSc_8.pdf</a></td>
</tr>
<tr>
<td>PISA</td>
<td>Status declared by Students</td>
<td>Nominal</td>
<td>Country specific</td>
<td>In what country were you and your parents born? You, Mother and Father</td>
<td>Immigrant Non-immigrant</td>
<td><a href="https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_M_S_STQ_NoNotes_final.pdf">https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_M_S_STQ_NoNotes_final.pdf</a></td>
</tr>
<tr>
<td>ERCE</td>
<td>Status declared by Students</td>
<td>Nominal</td>
<td>Country specific</td>
<td>¿Naciste en este país? Si no naciste en este país ¿qué edad tenías cuando llegaste?</td>
<td>Migrante No migrante</td>
<td><a href="https://unesdoc.unesco.org/ark:/48223/pf000243533">https://unesdoc.unesco.org/ark:/48223/pf000243533</a></td>
</tr>
<tr>
<td>PIACC</td>
<td>Status declared by respondents</td>
<td>Nominal</td>
<td>Country specific</td>
<td>Were you born in (country) in what country were you born? At what age or in which year did you first immigrant to (country)?</td>
<td>Foreign-born/Native-born</td>
<td><a href="https://www.oecd.org/skills/piaac/publications/PIAAC_Technical_Report_2019.pdf">https://www.oecd.org/skills/piaac/publications/PIAAC_Technical_Report_2019.pdf</a></td>
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<tr>
<td>EGMA EGRA</td>
<td>The main language is declared by the student</td>
<td>Nominal</td>
<td>Country specific</td>
<td>Do you speak the same language at home as you speak at school?</td>
<td></td>
<td><a href="http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf">http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf</a></td>
</tr>
<tr>
<td>PASEC</td>
<td>The main language is declared by the student</td>
<td>Nominal</td>
<td>Country specific</td>
<td>Quelle langue parles-tu chez toi?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PISA</td>
<td>The main language is declared by the student</td>
<td>Nominal</td>
<td>Country specific</td>
<td>What language do you speak at home of the time? Students who speak mainly another language at home / Students who speak mainly the test language at home</td>
<td></td>
<td><a href="https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_STQ_NoNotes_final.pdf">https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_STQ_NoNotes_final.pdf</a></td>
</tr>
<tr>
<td>SACMEQ</td>
<td>The main language is declared by the student</td>
<td>Nominal</td>
<td>2</td>
<td>Do you speak English outside school? Yes/No</td>
<td></td>
<td><a href="http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf">http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf</a></td>
</tr>
<tr>
<td>LLECE</td>
<td>The main language is declared by the student</td>
<td>Nominal</td>
<td>4</td>
<td>En tu casa ¿qué idioma hablan la mayor parte del tiempo? Castellano o portugués, lengua extranjera, lengua indígena, otra lengua</td>
<td>Habla lengua de la evaluación No habla lengua de la evaluación</td>
<td><a href="https://unesdoc.unesco.org/ark:/48223/pf0000243533">https://unesdoc.unesco.org/ark:/48223/pf0000243533</a></td>
</tr>
</tbody>
</table>
4.1.1 Proportion of children and young people (a) in Grade 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

ANNEX II

Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT</td>
<td>Content Alignment Tool</td>
</tr>
<tr>
<td>CLA</td>
<td>Catalogue of Learning Assessments</td>
</tr>
<tr>
<td>CNA</td>
<td>Cross-national assessments</td>
</tr>
<tr>
<td>GAML</td>
<td>Global Alliance to Monitoring Learning</td>
</tr>
<tr>
<td>GCF</td>
<td>Global Content Framework</td>
</tr>
<tr>
<td>GPF</td>
<td>Global Proficiency Framework</td>
</tr>
<tr>
<td>IRT</td>
<td>Item response theory</td>
</tr>
<tr>
<td>ISCED</td>
<td>International Standard Classification of Education</td>
</tr>
<tr>
<td>MPL</td>
<td>Minimum proficiency level</td>
</tr>
<tr>
<td>PAT</td>
<td>Procedural Alignment Tool</td>
</tr>
<tr>
<td>PLD</td>
<td>Performance level descriptors</td>
</tr>
<tr>
<td>SDG</td>
<td>Sustainable Development Goal</td>
</tr>
<tr>
<td>TCG</td>
<td>Technical Cooperation Group</td>
</tr>
</tbody>
</table>

Assessments

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASER</td>
<td>Annual Status of Education Report</td>
</tr>
<tr>
<td>EGRA</td>
<td>Early Grade Reading Assessment</td>
</tr>
<tr>
<td>EGMA</td>
<td>Early Grade Mathematics Assessment</td>
</tr>
<tr>
<td>ERCE</td>
<td>Regional Comparative and Explanatory Study</td>
</tr>
<tr>
<td>LLECE</td>
<td>El Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación</td>
</tr>
<tr>
<td>MICS</td>
<td>Multiple Indicator Cluster Surveys</td>
</tr>
<tr>
<td>PAL Network</td>
<td>People’s Action for Learning Network</td>
</tr>
<tr>
<td>PASEC</td>
<td>Programme d’analyse des systèmes éducatifs de la confemen</td>
</tr>
<tr>
<td>PIACC</td>
<td>Programme for the International Assessment of Adult Competencies</td>
</tr>
<tr>
<td>PILNA</td>
<td>Pacific Islands Literacy and Numeracy Assessment</td>
</tr>
<tr>
<td>PIRLS</td>
<td>Progress in International Reading Literacy Study</td>
</tr>
<tr>
<td>PISA</td>
<td>Programme for International Student Assessment</td>
</tr>
<tr>
<td>PISA-D</td>
<td>Programme for International Student Assessment for Development</td>
</tr>
<tr>
<td>SACMEQ</td>
<td>Southern and Eastern Africa Consortium for Monitoring Education Quality</td>
</tr>
<tr>
<td>SEAMEO</td>
<td>Southeast Asian Ministers of Education Organization</td>
</tr>
<tr>
<td>TIMSS</td>
<td>Trends in International Mathematics and Science Study</td>
</tr>
<tr>
<td>UWEZO</td>
<td>(not an acronym)</td>
</tr>
</tbody>
</table>
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**Metadata**

**Target 4.1** By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

**4.1.2 Completion rate (primary education, lower secondary education, upper secondary education)**

**Definition**

Percentage of a cohort of children or young people aged 3-5 years above the intended age for the last grade of each level of education who have completed that grade.

The *intended age for the last grade* of each level of education is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade.

For example, if the official age of entry into primary education is 6 years, and if primary education has 6 grades, the intended age for the last grade of primary education is 11 years. In this case, 14-16 years (11 + 3 = 14 and 11 + 5 = 16) would be the reference age group for calculation of the primary completion rate.

**Purpose**

The completion rate indicates how many persons in a given age group have completed the relevant level of education. By choosing an age-group which is slightly older than the theoretical age group for completing each level of education, the indicator measures how many children and adolescents enter school more or less on time and progress through the education system without excessive delays.

**Calculation method**

The number of persons in the relevant age group who have completed the last grade of the given level of education is expressed as a percentage of the total population (in the survey sample) of the same age group. As with attendance rates, individuals are assigned completion age group based on actual or assumed age at the beginning of the school year.
\[ CR_n = \frac{EAP_{n,AG(a+3t5)}}{PAG_{(a+3t5)}} \]

where:

\( CR_n \) = completion rate for level \( n \) of education

\( EAP_{n,AG(a+3t5)} \) = population aged 3 to 5 years above the official entrance age \( a \) into the last grade of level \( n \) of education who completed level \( n \)

\( PAG_{(a+3t5)} \) = population aged 3 to 5 years above the official entrance age \( a \) into the last grade of level \( n \) of education

**Interpretation**

A completion rate at or near 100% indicates that most or all children and adolescents have completed a level of education by the time they are 3 to 5 years older than the official age of entry into the last grade of the given level of education.

A low completion rate indicates low or delayed entry into a given level of education, high drop-out, high repetition, late completion, or a combination of these factors.

To identify the causes of low completion rates, it is necessary to examine other indicators, for example the out-of-school rate, the gross intake ratio to the last grade, and the percentage of over-age children.

When disaggregated by sex, location and other characteristics, this indicator can identify excluded population groups.

**Type of data source**

Population censuses, household surveys.

**Disaggregation**

Data from household surveys are usually disaggregated by sex, location and household wealth (socio-economic status) quintile. The location (urban or rural) is defined according to national standards, which may differ across countries. Household wealth quintiles are usually determined with the help of an asset index, calculated from assets owned by individual households. The indicator can also be disaggregated by age or age group of students, level of education, and other dimensions specified in the global indicator 4.5.1 (parity index) as available.

**Data required**

Population in the relevant age group by the highest level of education or grade completed; data on the structure (entrance age and duration) of each level of education. Data should
also ideally be made available on the date of interview and month of birth to calculate the age at the beginning of the school year.

**Data sources**
Population censuses and household surveys which collect data on the highest level of education or grade completed by children and young people in a household, through self- or household-declaration. In the former case, each household member above a certain age reports his or her own level of educational attainment. In the latter case, one person, usually the head of the household or another reference person, indicates the highest grade and/or level of education completed by each member of the household. Administrative data from ministries of education on the structure of the education system (entrance ages and durations) are also needed.

Surveys can serve as a source of data if they collect information for the age groups of concern. In addition to national surveys, international sample surveys, such as Demographic and Health Surveys (DHS, [http://dhsprogram.com](http://dhsprogram.com)) or Multiple Indicator Cluster Surveys (MICS, [http://mics.unicef.org](http://mics.unicef.org)), are another source. These surveys are designed to meet commonly agreed upon international data needs and aim to assure cross-national comparability, while also providing data for national policy purposes. These surveys are implemented on a regular basis in selected countries, on average every 3 to 5 years.

Population censuses can also be a source of attainment data but they are carried out less frequently than household surveys, often only once per decade.

Data on attainment collected with surveys or censuses are usually mapped to ISCED levels post-enumeration.

**Quality assurance**
Accurate data on the structure of the national education system and on educational attainment by single year of age are needed for calculating this indicator. The UIS sets standards, develops questionnaires and quality control protocols for country data reporting, and maintains the global database on the structure of national education systems. The global database with completion rates is maintained by the UIS and the Global Education Monitoring Report.

**Limitations and comments**
Education levels and grades reported in household surveys may not align with the country ISCED mappings, with implications for comparability. Programme completion is typically determined using data on the highest grade completed and the official duration for the given level. As a result, individuals that complete a programme corresponding to a given ISCED level that has a duration less than the official duration of that ISCED level are assumed to not
have completed. In addition, changes in the official duration of education levels over time can prevent the accurate assessment of the completion status of older cohorts.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

**Target 4.1** By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

**4.1.3 Gross intake ratio to the last grade (primary education, lower secondary education)**

**Definition**
Total number of new entrants into the last grade of primary education or lower secondary general education, regardless of age, expressed as a percentage of the population at the intended entrance age to the last grade of primary education or lower secondary general education.

The *intended entrance age to the last grade* is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade.

**Purpose**
This is a proxy measure of primary or lower secondary completion. It reflects how policies on access to and progression through the early grades of primary or lower secondary education impact the completion of the final grade of the given level. It also indicates the capacity of the education system to cater for the completion of the population of the intended entrance age to the last grade of the given level of education. It assumes that pupils entering the last grade for the first time will eventually complete the grade and hence the given level of education.

**Calculation method**
The number of new entrants in the last grade of the given level of education, regardless of age, is expressed as a percentage of the population of the intended entrance age to the last grade of that level of education.

\[
GIRLG_n = \frac{NE_{L,n}}{P_{n,a}}
\]
where:

\( GIRL_n = \text{gross intake ratio to the last grade } l \text{ of level } n \text{ of education} \)
\( NE_{l,n} = \text{new entrants to the last grade } l \text{ of level } n \text{ of education} \)
\( P_{n,a} = \text{population of the intended entrance age } a \text{ to the last grade of level } n \text{ of education} \)
\( n = 1 \text{ (primary) or } 2 \text{ (lower secondary)} \)

Note: If data on new entrants are not collected directly, they can be calculated by subtracting the number of pupils repeating the last grade from total enrolment in the last grade.

**Interpretation**
A high ratio indicates a high degree of primary or lower secondary education completion.

**Type of data source**
Administrative data.

**Disaggregation**
By sex and level of education.

**Data required**
New entrants to the last grade of each level of education (or enrolment minus repeaters in the last grade); population of the intended entrance age to the last grade of each level of education and data on the structure (entrance age and duration) of each level of education.

**Data sources**
Administrative data from schools on enrolment and repeaters or new entrants by grade; population censuses and surveys for population estimates by single year of age; administrative data from ministries of education on the structure of the education system.

**Quality assurance**
Accurate data on new entrants to the last grade of primary and lower secondary education are critical for quality assurance for this indicator. The UIS ensures standard setting and quality control of corresponding data collected from countries and maintains the global database used to produce this indicator.

**Limitations and comments**
This is a gross measure and may therefore exceed 100% if there are large numbers of pupils who entered school either early or late and/or who have repeated earlier grades. The fact that the GIR can exceed 100% also makes it more difficult to interpret than the completion rate.
Compared to the completion rate, the gross intake ratio to the last grade does not indicate how many children complete the last grade, only how many children enter that grade. If students in the last grade leave school before graduation, the gross intake ratio to the last grade overestimates completion.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

**Target 4.1** By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

**4.1.4 Out-of-school rate (1 year before primary, primary education, lower secondary education, upper secondary education)**

**Definition**
Proportion of children and young people in the official age range for the given level of education who are not enrolled in pre-primary, primary, secondary or higher levels of education.

**Purpose**
To identify the size of the population in the official age range for the given level of education who are not enrolled in school in order that they can be better targeted and appropriate policies can be put in place to ensure they have access to education.

**Calculation method**
The number of students of the official age for the given level of education enrolled in pre-primary, primary, secondary or higher levels of education is subtracted from the total population of the same age. The result is expressed as a percentage of the population of the official age for the respective level of education. For primary, lower secondary and upper secondary education, the official age groups for the respective level of education are used in the indicator calculation. For pre-primary education, the indicator is calculated for children aged one year before the official age of entry into primary education.

\[
OSR_n = \frac{SAP_n - \sum_{i=0}^{8} E_{LAGn}}{SAP_n}
\]

Where:
- \( OSR_n \) = out-of-school rate for children and young people of the official age for level \( n \) of education
- \( SAP_n \) = population of the official age for level \( n \) of education
\[ E_{i,A,n} = \text{enrolment in ISCED level } i \text{ of children and young people of the official age for level } n \text{ of education} \]

**Interpretation**

The higher the rate and number of out-of-school children and adolescents, the greater the need to focus on improving access to education. Some children have never been in school or may not eventually enrol as late entrants. Other children may have initially enrolled but dropped out before reaching the intended age of completion of the given level. When disaggregated by sex, location and other characteristics, this indicator can identify excluded population groups.

**Type of data source**

Administrative data, household surveys.

**Disaggregation**

By age or age-group and sex (administrative data); by age or age-group and sex, location, and socio-economic status (household surveys) and others as available.

**Data required**

Enrolment by single year of age in each level of education, population estimates by single year of age and data on the structure (entrance age and duration) of each level of education.

**Data sources**

Administrative data from schools or household survey data on enrolment by single year of age; population censuses and surveys for population estimates by single year of age (if using administrative data on enrolment); administrative data from ministries of education on the structure (entrance age and duration) of the education system.

**Quality assurance**

Accurate data on school age population by single year of age, on the structure of each level of education, and on enrolment by single year of age and by level of education from all types of educational institutions (public and private), are essential for calculating this indicator. The UIS sets standards, develops questionnaires and quality control protocols for country data reporting, and maintains the global database on the structure of education and enrolment data. The United Nations Population Division (UNPD) produces and maintains population data.

**Limitations and comments**

Inconsistencies between enrolment and population data from different sources may result in inaccurate estimates of out-of-school children and adolescents. Data from household
surveys conducted late in the school year where ages are recorded at the enumeration date may result in over-estimates.
For primary, lower secondary and upper secondary education, the official age groups for the respective level of education are used in the indicator calculation. The out-of-school rate for pre-primary education is calculated for children aged one year before the official age of entry into primary education.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.1.5 Percentage of children over-age for grade (primary education, lower secondary education)

Definition
Percentage of pupils in each level of education (primary and lower secondary general education) who are at least 2 years above the intended age for their grade.

The intended age for a given grade is the age at which pupils would enter the grade if they had started school at the official primary entrance age, had studied full-time and had progressed without repeating or skipping a grade.

Purpose
The indicator measures progress towards ensuring all girls and boys complete a full cycle of quality primary and lower secondary education and achieve at least minimum levels of proficiency in reading and mathematics at each level.

Children may be over-age for a grade because they started school late and/or they have repeated one or more previous grades.

Calculation method
The sum of enrolments across all grades in the given level of education which are 2 or more years older than the intended age for the given grade is expressed as a percentage of the total enrolment in the given level of education.

\[ POAG_n = \frac{\sum_{g=1}^{d_n} E_{n,g,AG,2+}}{E_n} \]

where:
\( POAG_n \) = percentage of children over-age for grade in level \( n \) of education
\( E_{n,g,A,G,2+} \) = enrolment in grade \( g \) of level \( n \) of education who are aged at least 2 years older than the intended age for that grade
\( E_n \) = total enrolment in level \( n \) of education (all grades combined)
\( d_n \) = duration (in years) of level \( n \) of education
\( n \) = 1 (primary) or 2 (lower secondary general)

**Interpretation**
A low value of this indicator will show that the majority of students start school on time and progress with minimum levels of grade repetition. Late school entry and significant grade repetition exacerbate over-age progression and should be discouraged as both are associated with lower levels of student learning achievement.

**Type of data source**
Administrative data, household surveys.

**Disaggregation**
By sex (administrative data); by sex, location, and socio-economic status (household surveys) and others as available.

**Data required**
Enrolment by single year of age in each grade, population estimates by single year of age and data on the structure (entrance age and duration) of each level of education.

**Data sources**
Administrative data from schools or household survey data on enrolment by single year of age and grade; population censuses and surveys for population estimates by single year of age (if using administrative data on enrolment); administrative data from ministries of education on the structure of the education system.

**Quality assurance**
Accurate data on school age population by single year of age, on the structure of each level of education (primary, lower secondary), and on enrolment by single year of age in each grade from all types of educational institutions (public and private), are essential for calculating this indicator. The UIS sets standards, develop questionnaires and quality control protocols for country data reporting, and maintains the global database on the structure of education and enrolment data. The United Nations Population Division (UNPD) produces and maintains population data.
Limitations and comments
Inconsistencies between enrolment and population data from different sources may result in inaccurate estimates of this indicator. Data from household surveys conducted late in the school year where ages are recorded at the enumeration date may result in over-estimates.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

TARGET 4.1

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

4.1.6 Administration of a nationally representative learning assessment (a) in Grade 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education.

Definition

Whether a national or cross-national learning assessment was conducted in the last 5 years in (a) reading, writing or language and (b) mathematics at the relevant stages of education.

Purpose

The capacity of countries to assess learning via large-scale assessments is key to monitoring quality and equity of learning. The administration of national learning assessments is essential to supply information on the performance of education systems at least every five years.

Calculation method

The indicator is expressed as a simple ‘yes’ or ‘no’ for each subject area and each stage of education.

\[ LA_{n,s}^{t-i} = \begin{cases} 1, & \text{yes if there exists a national, regional or international learning assessment in any year between } t-5 \text{ and } t \\ 0, & \text{no otherwise} \end{cases} \]

where:

- \( LA_{n,s}^{t-i} \) = existence of a national, regional or international learning assessment at stage of education \( n \), in subject \( s \) in any year \( (t-i) \) where \( 0 \leq i \leq 5 \)
4.1.6 Administration of a nationally representative learning assessment (a) in Grade 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education

Interpretation
‘Yes’ values indicate that the country is monitoring learning outcomes regularly at the given stage of education and in the given subject areas. This will enable the country to review and adapt as necessary its national policies on education and learning to ensure that all children and young people have the opportunity to acquire basic skills at each education level and in each subject area.

Type of data source
Learning assessments

Disaggregation
By stage or level of education and subject

Data required
Information on the implementation of learning assessments in each subject and at each stage of education in each country.

Data sources
Data on the administration of a large-scale assessment from a national representative sample from national learning assessment offices, ministries of education or other bodies responsible for learning assessments, including regional or international organizations running learning assessments (e.g. CONFEMEN, EQAP, IEA, OECD, SACMEQ and TERCE).

Limitations and comments
In calculating this indicator, language or writing assessments are also considered as types of reading assessments. The indicator does not measure the skills of children but only the existence of assessments in a country.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Metadata

Target 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.1.7 Number of years of (a) free and (b) compulsory primary and secondary education guaranteed in legal frameworks

Definition
Number of years of primary and secondary education to which children and young people are legally entitled that are either free from tuition fees or compulsory or both.

Most countries have legislation specifying the ages and the level of education (typically pre-primary or primary education) at which children should start school. Such legislation usually also specifies either the number of years of education that are guaranteed or the age at which young people may leave education or, in some cases, both.

The number of years of primary and secondary education to which children are legally entitled should ideally be the number of grades of primary and secondary education which young people are expected to have completed before being legally eligible to leave school. Years of pre-primary education covered by the legal entitlement should be excluded from this indicator (and reported in Indicator 4.2.5 instead).

Purpose
To measure government commitment to guaranteeing the right to education to children and young people.

Calculation method
Record the number of grades of primary and secondary education that are guaranteed. If using ages rather than grades, subtract from the upper age, either the lower age if it is an age at which a child should be in primary school or, if not, subtract the official entrance age to primary school. If the upper age is the age at the start of the last year of free or compulsory education, it will be necessary to add 1 to the result.
\[ YF_{123} = \text{number of years of free primary and secondary education (ISCED levels 1, 2 and 3)} \]
\[ YC_{123} = \text{number of years of compulsory primary and secondary education (ISCED levels 1, 2 and 3)} \]

**Interpretation**
The existence of national legislation guaranteeing the right to education at given ages and/or grades demonstrates the government's commitment to ensuring that children and young people attend school regularly. The greater the number of years guaranteed the more likely that children and young people will remain in school longer and have the opportunity to acquire the necessary skills and competencies at each level of education.

**Type of data source**
Administrative data.

**Disaggregation**
By level of education.

**Data required**
Number of grades of primary and secondary education which are (a) free from tuition fees and/or (b) compulsory according to national legislation. If the number of grades is not specified, the age range in which education is (a) free and/or (b) compulsory may be used instead. Data on the structure (entrance age and duration) of each level of education are also required.

**Data sources**
National legislation and formal education standards and norms on access to schooling and, in particular, the legal entitlement or obligation to attend school; and administrative data from ministries of education on the structure of the education system.

**Quality assurance**
The UIS maintains a global database used to produce this indicator. The indicator should be based on actual information on free and compulsory education by age and grade from official national legislation documents or education Acts.

**Limitations and comments**
The existence of national legislation does not guarantee that countries ensure that it is implemented effectively and that parents are indeed ensuring their children benefit from the provision available.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

4.2.1 Proportion of children aged 24-59 months of age who are developmentally on track in health, learning and psychosocial well-being, by sex

Definition
The proportion of children aged 24 to 59 months who are developmentally on track in health, learning and psychosocial well-being.

Rationale
Early childhood development (ECD) sets the stage for life-long thriving. Investing in ECD is one of the most critical and cost-effective investments a country can make to improve adult health, education and productivity in order to build human capital and promote sustainable development. ECD is equity from the start and provides a good indication of national development. Efforts to improve ECD can bring about human, social and economic improvements for both individuals and societies.

Concepts
The domains included in the indicator for SDG indicator 4.2.1 include the following concepts:

- Health: gross motor development, fine motor development and self-care
- Learning: expressive language, literacy, numeracy, pre-writing, and executive functioning
- Psychosocial well-being: emotional skills, social skills, internalizing behavior, and externalizing behavior

The recommended measure for SDG 4.2.1 is the Early Childhood Development Index 2030 (ECDI2030) which is a 20-item instrument to measure developmental outcomes among children aged 24 to 59 months in population-based surveys. The indicator derived from the ECDI2030 is the proportion of children aged 24 to 59 months who have achieved the minimum number of milestones expected for their age group, defined as follows:
4.2.1 Proportion of children aged 24-59 months of age who are developmentally on track in health, learning and psychosocial well-being, by sex

- Children age 24 to 29 months are classified as developmentally on-track if they have achieved at least 7 milestones;
- Children age 30 to 35 months are classified as developmentally on-track if they have achieved at least 9 milestones;
- Children age 36 to 41 months are classified as developmentally on-track if they have achieved at least 11 milestones;
- Children age 42 to 47 months are classified as developmentally on-track if they have achieved at least 13 milestones;
- Children age 48 to 59 months are classified as developmentally on-track if they have achieved at least 15 milestones.

Comments and limitations
SDG 4.2.1 was initially classified as Tier 3 and was upgraded to Tier 2 in 2019; additionally, changes to the indicator were made during the 2020 comprehensive review. In light of this and given that the ECDI2030 was officially released in March 2020, it will take some time for country uptake and implementation of the new measure and for data to become available from a sufficiently large enough number of countries. Therefore, in the meantime, a proxy indicator (children aged 36-59 months who are developmentally on-track in at least three of the following four domains: literacy-numeracy, physical, social-emotional and learning) will be used to report on 4.2.1, when relevant. This proxy indicator has been used for global SDG reporting since 2015 but is not fully aligned with the definition and age group covered by the SDG indicator formulation. When the proxy indicator is used for SDG reporting on 4.2.1 for a country, it will be footnoted as such in the global SDG database.

Methodology
Computation Method
The number of children aged 24 to 59 months who are developmentally on track in health, learning and psychosocial well-being divided by the total number of children aged 24 to 59 months in the population multiplied by 100.

Disaggregation
Disaggregation by child's age is required for this indicator.

Additional valuable disaggregation to consider include child's sex, place of residence, household wealth, geographic location and caregivers' education.

Treatment of missing values
- At country level
  When data for a country are entirely missing, UNICEF does not publish any country-level estimate.
4.2.1 Proportion of children aged 24-59 months of age who are developmentally on track in health, learning and psychosocial well-being, by sex

- At regional and global levels
  The regional average is applied to those countries within the region with missing values for the purposes of calculating regional aggregates only but are not published as country-level estimates. Regional aggregates are only published when at least 50 per cent of the regional population for the relevant age group are covered by the available data.

  The global aggregate is a weighted average of all countries with available data. Global aggregates are published regardless of population coverage, but the number of countries and the proportion of the relevant population group represented by the available data are clearly indicated.

Regional aggregates
Regional aggregates are weighted averages of all the countries within the region.

Sources of discrepancies
The estimates compiled and presented at global level come directly from nationally produced data and are not adjusted or recalculated.

Methods and guidance available to countries for the compilation of the data at the national level
Countries gather prevalence data on children’s developmental status through household surveys such as UNICEF-supported MICS or Demographic and Health Surveys.

Quality assurance
UNICEF maintains the global database on ECD that is used for SDG and other official reporting. Before the inclusion of any data point in the database, it is reviewed by technical focal points at UNICEF headquarters to check for consistency and overall data quality. This review is based on a set of objective criteria to ensure that only the most recent and reliable information are included in the databases. These criteria include the following: data sources must include proper documentation; data values must be representative at the national population level; data are collected using an appropriate methodology (e.g., sampling); data values are based on a sufficiently large sample; data conform to the standard indicator definition including age group and concepts, to the extent possible; data are plausible based on trends and consistency with previously published/reported estimates for the indicator.

As of 2018, UNICEF undertakes an annual consultation with government authorities on 10 of the child-related SDG indicators in its role of sole or joint custodian, and in line with its global monitoring mandate and normative commitments to advancing the 2030 Agenda for children. This includes indicator 4.2.1. More details on the process for the country consultation are outlined below.
4.2.1 Proportion of children aged 24-59 months of age who are developmentally on track in health, learning and psychosocial well-being, by sex

Data Sources

Description

In 2015, UNICEF initiated a process of methodological development that involved extensive consultations with experts, partner agencies and national statistical authorities. Over the following five years, a sequence of carefully planned technical steps were executed, incorporating both qualitative and quantitative methods to identify the best items to measure indicator 4.2.1. This process led to the development of the ECDI2030.

The ECDI2030 addresses the need for nationally representative and internationally comparable data on early childhood development, collected in a standardized way. It captures the achievement of key developmental milestones by children between the ages of 24 and 59 months. Mothers or primary caregivers are asked 20 questions about the way their children behave in certain everyday situations, and the skills and knowledge they have acquired.

The ECDI2030 can be integrated into existing national data collection efforts, including international household survey programmes such as UNICEF-supported MICS and the Demographic and Health Surveys.

The ECDI2030 is meant to replace the Early Childhood Development Index (or ECDI) which collects data on the proxy indicator for SDG 4.2.1 that has been in use since 2015. The former ECDI and the new ECDI2030 target different age groups and measure slightly different development domains. Therefore, the indicators generated by both instruments may not be fully comparable and caution is needed when interpreting estimates produced by the two measures.

Collection process

UNICEF undertakes a wide consultative process of compiling and assessing data from national sources for the purposes of updating its global databases on the situation of children. Up until 2017, the mechanism UNICEF used to collaborate with national authorities on ensuring data quality and international comparability on key indicators of relevance to children was known as Country Data Reporting on the Indicators for the Goals (CRING).

As of 2018, UNICEF launched a new country consultation process with national authorities on selected child-related global SDG indicators it is custodian or co-custodian to meet emerging standards and guidelines on data flows for global reporting of SDG indicators, which place strong emphasis on technical rigour, country ownership and use of official data and statistics. The consultation process solicited feedback directly from National Statistical Offices, as well as other government agencies responsible for official statistics, on the compilation of the indicators, including the data sources used, and the application of internationally agreed definitions, classification and methodologies to the data from that source. Once reviewed, feedback is made available to countries on whether or not specific
4.2.1 Proportion of children aged 24-59 months of age who are developmentally on track in health, learning and psychosocial well-being, by sex

data points are accepted, and if not, the reasons why. More details on the consultation process can be found in the guidance note.

Data Availability
Description
Data on the indicator collected through implementation of the ECDI2030 are expected to become available beginning in 2021. Comparable data collected by the ECDI are currently available for close to 80 countries. Countries with data on the proxy indicator collected with the ECDI will continue to be used for global SDG reporting until new data using the ECDI2030 are available.

Time series
Not available

Calendar
Data collection
UNICEF will undertake an annual country consultation likely between December and January every year to allow for review and processing of the feedback received in order to meet global SDG reporting deadlines.

Data release
Updated data on 4.2.1 as measured by the ECDI2030 will be available in the SDG reporting period every February/March.

Data providers
National Statistical Offices (in most cases)

Data compilers
UNICEF

References
URL: data.unicef.org

References
http://data.unicef.org/ecd/development-status.html

Development of the early childhood development index in MICS surveys (MICS Methodological Papers, Paper no. 6: https://tinyurl.com/y8t82jyk)

Related indicators
Indicator 4.2.2: Participation rate in organized learning (one year before the official primary entry age), by sex

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SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**Metadata**

**Target 4.2** By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

**4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex**

**Definition**
Percentage of children aged one year before the official primary entry age, who participate in one or more organized learning programme, including programmes which offer a combination of education and care. Participants in early childhood education and in primary education are both included. The target age varies by country depending on the official age for entry to primary education.

An organized learning programme is one which consists of a coherent set or sequence of educational activities designed with the intention of achieving pre-determined learning outcomes or the accomplishment of a specific set of educational tasks. Early childhood and primary education programmes are examples of organized learning programmes.

Early childhood and primary education are defined in the 2011 revision of the International Standard Classification of Education (ISCED 2011). Early childhood education is typically designed with a holistic approach to support children’s early cognitive, physical, social and emotional development and to introduce young children to organized instruction outside the family context. Primary education offers learning and educational activities designed to provide students with fundamental skills in reading, writing and mathematics and establish a solid foundation for learning and understanding core areas of knowledge and personal development. It focuses on learning at a basic level of complexity with little, if any, specialisation.

The official primary entry age is the age at which children are expected to start primary education according to national legislation or policies. Where more than one age is specified, for example, in different parts of a country, the most common official entry age (i.e. the age
at which most children in the country are expected to start primary) is used for the calculation of this indicator at the global level.

**Purpose**
The indicator measures children’s exposure to organized learning activities when they are aged one year before the official starting age of primary school.

**Calculation method**
The number of children at the target age who participate in an organized learning programme expressed as a percentage of the total population of the same age.

\[
PROL_{0t1,AG(a-1)} = \frac{E_{0t1,AG(a-1)}}{SAP_{AG(a-1)}}
\]

where:

- \( PROL_{0t1,AG(a-1)} \) = participation rate in organized learning one year before the official entry age \( a \) to primary education
- \( E_{0t1,AG(a-1)} \) = enrolment in early childhood or primary education (ISCED levels 0 and 1) aged one year below the official entry age \( a \) to primary education
- \( SAP_{AG(a-1)} \) = population aged one year below the official entry age \( a \) to primary education

**Interpretation**
A high value of the indicator, at or near 100%, indicates that all or most children are participating in organized learning immediately before the official entrance age to primary education. A low value of the indicator indicates low or delayed participation in organized learning programmes.

**Type of data source**
Administrative data, household surveys.

**Disaggregation**
By sex from administrative sources; and by sex, location, and income from household surveys and others as available.

**Data required**
Number of children participating in organized learning activities by single year of age; population estimates by single year of age (if using administrative data); and data on the official entrance age to primary education.
Data sources
Administrative data from schools and other centres of organized learning or from household surveys on enrolment by single year of age in early learning programmes; population censuses and surveys for population estimates by single year of age (if using administrative data on enrolment); administrative data from ministries of education on the official entrance age to primary education.

Quality assurance
The indicator should be based on enrolment by single year of age in early learning programmes in all types of education institutions, including public, private and all other institutions that provide organized educational programmes. The UIS maintains the global database used to produce this indicator.

Limitations and comments
Participation in learning programmes in the early years is not full time for many children, meaning that exposure to learning environments outside of the home will vary in intensity. The indicator measures the percentage of children who are exposed to organized learning but not the intensity or quality of the programme. More work is needed to ensure that the definition of learning programmes is consistent across various surveys and defined in a manner that is easily understood by survey respondents, ideally with complementary information collected on the amount of time children spend in learning programmes.
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4.2.3 Percentage of children under 5 years experiencing positive and stimulating home learning environments

Definition
Percentage of children aged 36-59 months who live in households where their mother, father or other adult household members engage with them in the following types of activities: reading or looking at picture books; telling stories; singing songs; taking children outside the home; playing; and naming, counting and/or drawing.

Purpose
Within the home, caregivers are tasked with establishing a safe, stimulating and nurturing environment and providing direction and guidance in daily life. Interactions with responsible caregivers who are sensitive and responsive to children's emerging abilities are central to social, emotional and cognitive development. This type of positive caregiving can help children feel valued and accepted, promote healthy reactions, provide a model for acceptable social relationships, and contribute to later academic and employment success.

This indicator provides a broad measure of the ways in which adults in the household interact with children in meaningful and stimulating ways to promote learning and school readiness.

Calculation method
The indicator is calculated as the percentage of children aged 36-59 months participating in activities in the areas being measured.

\[
PCPSH_{3t4} = \frac{CPSH_{3t4}}{P_{3t4}}
\]

where:

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4.2.3 Percentage of children under 5 years experiencing positive and stimulating home learning environments

PCPSH$_{3t4}$ = percentage of children aged 36-59 months experiencing positive and stimulating home learning environments

CPSH$_{3t4}$ = children aged 3-4 years experiencing positive and stimulating home learning environments

P$_{3t4}$ = population aged 3-4 years

**Interpretation**
A high value indicates a large number of young children live in households which are supportive and provide stimulating learning environments.

**Type of data source**
Household surveys

**Disaggregation**
By age, sex, location, income, and others as available.

**Data required**
The number of children aged 36-59 months participating in activities in the areas being measured and the total number of children in the same age group.

**Data sources**
Measures of positive and stimulating home learning environments for young children which have been used in multiple countries are available from surveys and assessments, including the Multiple Indicator Cluster Surveys, Programa Regional de Indicadores de Desarrollo Infantil (PRIDI) in Latin America, Young Lives and others.

**Limitations and comments**
Further methodological developmental work will be needed to ensure that the proposed measure is relevant to children in all parts of the world.
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4.2.4 Gross early childhood education enrolment ratio in (a) pre-primary education and (b) early childhood educational development

Definition
Total enrolment in (a) pre-primary education and (b) early childhood educational development regardless of age expressed as a percentage of the population of the official age for the respective level of education.

Purpose
To show separately the general level of participation in the two categories of early childhood education: pre-primary education and early childhood educational development. The values indicate the capacity of the education system to enrol children of early childhood education age.

Calculation method
The number of students enrolled in the given category of early childhood education is expressed as a percentage of the population of the official age for the respective level of education.

\[ GER_{0,c} = \frac{E_c}{SAP_{0,c}} \]

where:
\( GER_{0,c} \) = gross early childhood education enrolment ratio in category \( c \)
\( E_c \) = enrolment in early childhood education category \( c \)
\( SAP_{0,c} \) = population of the official age for category \( c \)
\( C \) = early childhood education (ISCED level 0), early childhood educational development (ISCED level 01), or pre-primary education (ISCED level 02)
**Interpretation**
A high value generally indicates a high degree of participation, whether the pupils belong to the official age group or not. A value approaching or exceeding 100% indicates that a country is, in principle, able to accommodate all of its early childhood education-age population, but it does not indicate the proportion already enrolled. The achievement of a gross enrolment ratio of 100% is therefore a necessary but not sufficient condition for enrolling all eligible children in early childhood education.

**Type of data source**
Administrative data, household surveys.

**Disaggregation**
By sex from administrative sources; and by sex, location and income from household surveys and others as available.

**Data required**
Enrolment in pre-primary education and early childhood educational development; population estimates by single year of age (if using administrative data) and data on the structure (entrance age and duration) of early childhood education.

**Data sources**
Administrative data from schools or household survey data on enrolment; population censuses and surveys for population estimates by single year of age (if using administrative data on enrolment); administrative data from ministries of education on the structure (entrance age and duration) of early childhood education.

**Quality assurance**
The indicator at each level of education should be based on total enrolment in all types of education institutions, including public, private and all other institutions that provide organized educational programmes. The UIS maintains the global database used to produce this indicator.

**Limitations and comments**
The gross enrolment ratio can exceed 100% due to the inclusion of over-aged or under-aged pupils because of early or late entrance.
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METADATA

Target 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education

4.2.5 Number of years of (a) free and (b) compulsory pre-primary education guaranteed in legal frameworks

Definition
Number of years of pre-primary education to which children are legally entitled that are either free from tuition fees or compulsory or both.

Most countries have legislation specifying the ages and the level of education (typically pre-primary or primary education) at which children should start school. Such legislation usually also specifies either the number of years of education that are guaranteed or the age at which young people may leave education or, in some cases, both.

The number of years of pre-primary education to which children are legally entitled should ideally be the number of grades of pre-primary education which children are expected to have completed before entering primary education.

Purpose
To measure government commitment to guaranteeing the right to education to children and young people.

Calculation method
Record the number of grades of pre-primary education that are guaranteed. If using ages rather than grades, subtract the lower age from the official entrance age to primary school. If the result is 0 or negative, there are no years of pre-primary education which are guaranteed.

\[ Y_{F02} = \text{number of years of free pre-primary education (ISCED level 02)} \]
\[ Y_{C02} = \text{number of years of compulsory pre-primary education (ISCED level 02)} \]
**Interpretation**
The existence of national legislation guaranteeing the right to education at given ages and/or grades demonstrates the government's commitment to ensuring that children and young people attend school regularly. The greater the number of years of pre-primary education that are guaranteed, the more likely children will be well-prepared for entry to primary education at the appropriate time.

**Type of data source**
Administrative data.

**Disaggregation**
None.

**Data required**
Number of grades of pre-primary education which are (a) free from tuition fees and/or (b) compulsory according to national legislation. If the number of grades is not specified, the age range in which education is (a) free and/or (b) compulsory may be used instead. Data on the structure (entrance age and duration) of each level of education are also required.

**Data sources**
National legislation and formal education standards and norms on access to schooling and, in particular, the legal entitlement or obligation to attend school; and administrative data from ministries of education on the structure of the education system.

**Quality assurance**
The UIS maintains the global database used to produce this indicator. The indicator should be based on actual information on free and compulsory education by age and grade from official national legislation documents or education Acts.

**Limitations and comments**
The existence of national legislation does not guarantee that countries ensure that it is implemented effectively and that parents are indeed ensuring their children benefit from the provision available.
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**METADATA**

**Target 4.3** By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

**4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex**

**Definition**
Percentage of youth and adults in a given age range (e.g. 15-24 years, 25-64 years, etc.) participating in formal or non-formal education or training in a given time period (e.g. last 12 months).

*Formal education and training* is defined as education provided by the system of schools, colleges, universities and other formal educational institutions that normally constitutes a continuous ‘ladder’ of full-time education for children and young people, generally beginning at the age of 5 to 7 and continuing to up to 20 or 25 years old. In some countries, the upper parts of this ‘ladder’ are organized programmes of joint part-time employment and part-time participation in the regular school and university system.

*Non-formal education and training* is defined as any organized and sustained learning activities that do not correspond exactly to the above definition of formal education. Non-formal education may therefore take place both within and outside educational institutions and cater to people of all ages. Depending on national contexts, it may cover educational programmes to impart adult literacy, life-skills, work-skills, and general culture.

**Purpose**
To show the level of participation of youth and adults in education and training of all types.

**Calculation method**
The number of people in selected age groups participating in formal or non-formal education or training is expressed as a percentage of the population of the same age.

\[ PR_{AG_i} = \frac{E_{AG_i}}{P_{AG_i}} \]
where:

\[ PR_{Ag_i} = \text{participation rate of the population in age group } i \text{ in formal and non-formal education and training.} \]

\[ E_{Ag_i} = \text{enrolment of the population in age group } i \text{ in formal and non-formal education and training.} \]

\[ P_{Ag_i} = \text{population in age group } i. \]

\[ i = 15-24 \text{ years, 15 years and above, 25-64 years, etc.} \]

**Interpretation**

A high value indicates that a large share of the population in the relevant age group has access to and takes part in formal and non-formal education and training.

**Type of data source**

Administrative data, household surveys.

**Disaggregation**

By age and sex from administrative sources; and by age, sex, location and income from household surveys and others as available.

**Data required**

Numbers of participants by single year of age in formal and non-formal education and training; population estimates by single year of age.

**Data sources**

Administrative data from schools and other places of education and training or household survey data on participants in formal and non-formal education and training by single year of age; population censuses and surveys for population estimates by single year of age (if using administrative data on enrolment).

The Technical Cooperation Group on the Indicators for SDG 4 - Education 2030 (TCG) has recommended a set of survey questions to collect data for SDG indicators 4.3.1, 4.3.3 and 4.6.3 (see [http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2019/01/TCG5-REF-4-indicator-4.3.1.pdf](http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2019/01/TCG5-REF-4-indicator-4.3.1.pdf)).

**Quality assurance**

Accurate data on participation in formal and non-formal education and training by age or specific age-groups and by sex, and the corresponding population data from all types of educational institutions (public and private), formal and non-formal, are essential for calculating this indicator. The international reporting of enrolment data should be based on the 2011 International Standard Classification of Education maintained by the UIS. The United Nations Population Division (UNPD) produces and maintains population data.
Limitations and comments
Formal and non-formal education and training can be offered in a variety of settings including schools and universities, workplace environments and others and can have a variety of durations. Administrative data often capture only provision in formal settings such as schools and universities. Participation rates do not capture the intensity or quality of the provision nor the outcomes of the education and training on offer.
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METADATA

Target 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

4.3.2 Gross enrolment ratio for tertiary education, by sex

Definition
Total enrolment in tertiary education regardless of age expressed as a percentage of the population in the 5-year age group immediately following upper secondary education.

Purpose
To show the general level of participation in a given level of education. It indicates the capacity of the education system to enrol students of a particular age group.

Calculation method
Number of students enrolled in tertiary education, expressed as percentage of the 5-year age group immediately following upper secondary education.

\[
GER_{5t8} = \frac{E_{5t8}}{SAP_{5t8,a}}
\]

where:
\(GER_{5t8}\) = gross enrolment ratio in tertiary education (ISCED levels 5, 6, 7 and 8).
\(E_{5t8}\) = enrolment in tertiary education (ISCED levels 5, 6, 7 and 8).
\(SAP_{5t8,a}\) = population of the official age group \(a\) for tertiary education (ISCED levels 5, 6, 7 and 8).

Note: The population of the official age for tertiary education is estimated to be the 5-year age group immediately following upper secondary education. If the official entrance age to upper secondary is 15 years and the duration is 3 years, then \(a\) is the age group 18-22 years.

Interpretation
A high value of the indicator shows a high degree of participation in tertiary education by students of all ages.
**Type of data source**
Administrative data, household surveys.

**Disaggregation**
By sex from administrative sources; and by sex, location and income from household surveys and others as available.

**Data required**
Enrolment in tertiary education; population estimates by single year of age (if using administrative data) and data on the structure (entrance age and duration) of upper secondary education.

**Data sources**
Administrative data from schools and universities or household survey data on enrolment; population censuses and surveys for population estimates by single year of age (if using administrative data on enrolment); administrative data from ministries of education on the structure of upper secondary education.

**Quality assurance**
The indicator at each level of education should be based on total enrolment in all types of education institutions, including public and private.

**Limitations and comments**
The gross enrolment ratio is a broad measure of participation in tertiary education and does not take account of differences in duration of programmes between countries or between different levels of education and fields of study. It is standardised to some extent by measuring it relative to a 5-year age group for all countries but may underestimate participation especially in countries with poorly developed tertiary education systems or those where provision is limited to first tertiary programmes (which are generally shorter than 5 years in duration).
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**METADATA**

**Target 4.3** By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

**4.3.3 Participation rate in technical and vocational programmes (15- to 24-year-olds), by sex**

**Definition**
Percentage of young people aged 15-24 years participating in technical or vocational education either in formal or non-formal (e.g. work-based, or other settings) education, on a given date or during a specified period.

**Purpose**
To show the level of participation of youth in technical and vocational education and training.

**Calculation method**
The number of young people aged 15-24 years participating in technical and vocational education at secondary, post-secondary non-tertiary or tertiary levels of education is expressed as a percentage of the population of the same age group.

\[
P_{PR,15t24} = \frac{E_{V,15t24}}{P_{15t24}}
\]

where:
- \(P_{PR,15t24}\) = participation rate of young people aged 15-24 years in technical and vocational education and training,
- \(E_{V,15t24}\) = enrolment in technical and vocational education and training of young people aged 15-24 years,
- \(P_{15t24}\) = population aged 15-24 years.

**Interpretation**
A high value indicates a large share of the 15 to 24-year-old population are participating in education and training designed specifically to lead to a job.
**Type of data source**  
Administrative data, household surveys.

**Disaggregation**  
By age and sex from administrative sources; by age, sex, location and income from household surveys and others as available.

**Data required**  
Numbers of participants aged 15-24 years in technical and vocational education and training; population estimates for the age group 15-24 years.

**Data sources**  
Administrative data from schools and other places of education and training or household survey data on enrolment in technical and vocational programmes by single year of age; population censuses and surveys for population estimates for the age group 15-24 years (if using administrative data on enrolment).  
The Technical Cooperation Group on the Indicators for SDG 4 - Education 2030 (TCG) has recommended a set of survey questions to collect data for SDG indicators 4.3.1, 4.3.3 and 4.6.3 (see http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2019/01/TCG5-REF-4-indicator-4.3.1.pdf).

**Quality assurance**  
The indicator should be calculated based on data on the given age-group participation in technical and vocational education and training from both public and private schools. The UIS maintains a global database used to produce this indicator.

**Limitations and comments**  
Technical and vocational education and training can be offered in a variety of settings including schools and universities, workplace environments and others. Administrative data often capture only provision in formal settings such as schools and universities. Participation rates do not capture the intensity or quality of the provision nor the outcomes of the education and training on offer.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

**Target 4.4** By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

**4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill**

**Definition**
The proportion of youth and adults with information and communications technology (ICT) skills, by type of skill as defined as the percentage of individuals that have undertaken certain ICT-related activities in the last 3 months. The indicator is expressed as a percentage.

The indicator on the proportion of individuals with ICT skills, by type of skills refers to individuals that have undertaken certain computer-related activities in the last three months. (Please note however, that from 2020 this data will be collected with a different scope and response categories, as explained below.)

Computer-related activities to measure ICT skills are as follows:

- Copying or moving a file or folder
- Using copy and paste tools to duplicate or move information within a document
- Sending e-mails with attached files (e.g. document, picture, video)
- Using basic arithmetic formulas in a spreadsheet
- Connecting and installing new devices (e.g. a modem, camera, printer)
- Finding, downloading, installing and configuring software
- Creating electronic presentations with presentation software (including images, sound, video or charts)
- Transferring files between a computer and other devices
- Writing a computer program using a specialized programming language

*Updated February 2021*
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

A computer refers to a desktop computer, a laptop (portable) computer or a tablet (or similar handheld computer). It does not include equipment with some embedded computing abilities, such as smart TV sets, and devices with telephony as their primary function, such as smartphones.

Most individuals will have carried out more than one activity and therefore multiple responses are expected. The tasks are broadly ordered from less complex to more complex, although there is no requirement for a respondent to select simpler tasks before selecting a more complex task.

A decision was made in 2018 to modify the formulation of this indicator (At the 6th Expert Group meeting on ICT Household Indicators (EGH), in Geneva), to make the indicator independent of the device used. This data will be collected from member states from 2020 onwards, and incorporate changes to some of the skills categories that were agreed in the 6th and 7th EGH meetings. The revised and new skills categories will be:

- Using copy and paste tools to duplicate or move data, information and content in digital environments (e.g. within a document, between devices, on the cloud)
- Sending messages (e.g. e-mail, messaging service, SMS) with attached files (e.g. document, picture, video)
- Using basic arithmetic formulae in a spreadsheet
- Connecting and installing new devices (e.g. a modem, camera, printer) through wired or wireless technologies
- Finding, downloading, installing and configuring software and apps
- Creating electronic presentations with presentation software (including text, images, sound, video or charts)
- Transferring files or applications between devices (including via cloud-storage)
- Setting up effective security measures (e.g. strong passwords, log-in attempt notification) to protect devices and online accounts
- Changing privacy settings on your device, account or app to limit the sharing of personal data and information (e.g. name, contact information, photos)
- Verifying the reliability of information found online
- Programming or coding in digital environments (e.g. computer software, app development)

Purpose
ICT skills determine the effective use of information and communication technology, so this indicator may therefore assist in making the link between ICT usage and impact. The lack of such skills continues to be one of the key barriers keeping people from fully benefitting from the potential of information and communication technologies. These data may be used to inform targeted policies to improve ICT skills, and thus contribute to an inclusive information society.

Updated February 2021
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

This is also a core indicator of the Partnership on Measuring ICT for Development’s Core List of Indicators, which has been endorsed by the UN Statistical Commission (in 2014). More importantly, computer users in developed countries seem to possess more ICT skills than users in developing countries, pointing to a serious constraint on the development potential of developing countries and least developed countries (LCDs).

Calculation method

The indicator is calculated as the percentage of people in a given population who have responded 'yes' to a selected number of variables e.g. the use of ICT skills in various subject areas or learning domains, the use of ICT skills inside or outside of school and/or workplace, the minimum amount of time spent using ICT skills inside and outside of school and/or workplace, availability of internet access inside or outside of school and/or workplace, etc. in the past 3 months, regardless of where that activity took place.

\[
\text{PICT}_{a,s} = \frac{\text{ICT}_{a,s}}{P_a}
\]

where:

- \( \text{PICT}_{a,s} \) = percentage of people in age group \( a \) who have ICT skill \( s \)
- \( \text{ICT}_{a,s} \) = number of people in age group \( a \) who have ICT skill \( s \)
- \( P_a \) = population in age group \( a \)

Interpretation

This indicator makes the link between ICT usage and impact and helps measure and track the level of proficiency of users. A high value indicates that a large share of the reference population has the ICT skill being measured.

Type of data source

Countries can collect data on this indicator through national household surveys. Data for different countries are compiled by ITU.

Disaggregation

Since data for the indicator on the proportion of individuals with ICT skills, by type of skills are collected through a survey, classificatory variables for individuals can provide further information on the differences in ICT skills among men/women, children/adults (age groups), employed/unemployed, etc., according to national requirements These data may be used to inform targeted policies to improve ICT skills, and thus contribute to the development of an inclusive information society.

Data required

Information on the use of ICT skills or household surveys.

Updated February 2021
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

Data sources
Countries can collect data on this indicator through national household surveys, which collect data on the use of selected ICT skills. Data for different countries are compiled by ITU.

Limitations and comments
This indicator is relatively new but is based on an internationally-agreed definition and methodology, which have been developed under the coordination of International Telecommunications Union (ITU), through its Expert Groups and following an extensive consultation process with countries. It was also endorsed by the UN Statistical Commission in 2014, and again in 2020.

The indicator is based on the responses provided by interviewees regarding certain activities that they have carried out in a reference period of time. However, it is not a direct assessment of skills nor do we know if those activities were undertaken effectively. Data from UNICEF do not include observations for both sexes but for males and females that come from the Men/Women questionnaires and datasets in MICS. Indicators are calculated separately. UNICEF dataset covers 17 countries, of which Mongolia, Togo, Tunisia, and Zimbabwe are also available in the ITU dataset. ITU data was use for reporting for those four countries.

Limitations for time series comparability
In 2015, the questions in the questionnaire used by Eurostat countries, including North Macedonia, were changed to add a reference period of twelve months (“Which of the following software related activities have you carried out in the last 12 months?”). Therefore, for those countries, the ICT skills figures are typically higher in 2014 compared to 2015. ITU Questionnaires on ICT have a reference.
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

### International sources of data for Indicator 4.4.1

<table>
<thead>
<tr>
<th>Agency</th>
<th>Reference period</th>
<th>Reference period (source)</th>
<th>Skills Assessed</th>
<th>Target Population</th>
<th>Reference Area</th>
</tr>
</thead>
</table>
4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

<table>
<thead>
<tr>
<th>Agency</th>
<th>Reference period</th>
<th>Reference period (source)</th>
<th>Skills Assessed</th>
<th>Target Population</th>
<th>Reference Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNICEF¹</td>
<td>Last 3 months</td>
<td>Indicators and definitions (ICT skills) <a href="https://mics.unicef.org/files?job=W1siZiIsIjIwMTkvMDkvMjcvMTQvMTYvMzEvMjkzL01JQ1M2X0IuZGljYXRvcnNfYW5kX0RlZmluaXRpb25zXzlwMTkwOTE2LmRvY3giXV0&amp;sha=e06cbb45e0f451f4">link</a></td>
<td>Nine ICT skills such as writing a computer program, transferring a file, or finding, downloading, installing and configuring software. <a href="https://mics.unicef.org/methodological_work/6/MICS-EAGLE">link</a></td>
<td>Target population correspond to age group 15 to 49 years.</td>
<td>Bangladesh, Democratic People’s Republic of Korea, Democratic Republic of the Congo, Gambia, Ghana, Iraq, Kiribati, Kyrgyzstan, Lao People’s Democratic Republic, Lesotho, Madagascar, Mongolia, Sierra Leone, Suriname, Togo, Tunisia, Zimbabwe.</td>
</tr>
</tbody>
</table>

¹ Upon approval from ITU

Updated February 2021
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**Metadata**

**Target 4.4** By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

**4.4.2 Percentage of youth/adults who have achieved at least a minimum level of proficiency in digital literacy skills**

**Definition**

In this document, we use data from the Program for the International Assessment of Adult Competencies (PIAAC) to estimate the proportion of youth/adults who reach the targets set by SDG Thematic Indicator 4.4.2 for each country and region with available data. To do that, we build on the Digital Literacy Global Framework (Law et al., 2018) and the Recommendations on Assessment Tools for Monitoring Digital Literacy (Laanpere, 2019). So, drawing on this body of literature we use the following working definition of Digital Literacy (DL):

**Digital Literacy (DL)**

Digital literacy involves the confident and critical use of a full range of digital technologies for information, communication and basic problem-solving in all aspects of life. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet.

Based on the two reports mentioned above, we establish a global content framework for indicator 4.4.2. This exercise resulted in a framework with seven competence areas and several competences within each area (see Table 1). The main competence areas are Devices and software operations, Information and data literacy, Communication and collaboration, Digital content creation, Safety, Problem-solving, and Career-related competences.
Table 1. Global Content Framework for SDG indicators 4.4.2

<table>
<thead>
<tr>
<th>Competence areas</th>
<th>Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. Devices and software operations</td>
<td>0.1 Physical operations of digital devices</td>
</tr>
<tr>
<td></td>
<td>0.2 Software operations in digital devices</td>
</tr>
<tr>
<td>1. Information and data literacy</td>
<td>1.1 Browsing, searching and filtering data, information and digital content</td>
</tr>
<tr>
<td></td>
<td>1.2 Evaluating data, information and digital content</td>
</tr>
<tr>
<td></td>
<td>1.3 Managing data, information and digital content</td>
</tr>
<tr>
<td>2. Communication and collaboration</td>
<td>2.1 Interacting through digital technologies</td>
</tr>
<tr>
<td></td>
<td>2.2 Sharing through digital technologies</td>
</tr>
<tr>
<td></td>
<td>2.3 Engaging in citizenship through digital technologies</td>
</tr>
<tr>
<td></td>
<td>2.4 Collaborating through digital technologies</td>
</tr>
<tr>
<td></td>
<td>2.5 Netiquette</td>
</tr>
<tr>
<td></td>
<td>2.6 Managing digital identity</td>
</tr>
<tr>
<td>3. Digital content creation</td>
<td>3.1 Developing digital content</td>
</tr>
<tr>
<td></td>
<td>3.2 Integrating and re-elaborating digital content</td>
</tr>
<tr>
<td></td>
<td>3.3 Copyright and licences</td>
</tr>
<tr>
<td></td>
<td>3.4 Programming</td>
</tr>
<tr>
<td>4. Safety</td>
<td>4.1 Protecting devices</td>
</tr>
<tr>
<td></td>
<td>4.2 Protecting personal data and privacy</td>
</tr>
<tr>
<td></td>
<td>4.3 Protecting health and well-being</td>
</tr>
<tr>
<td></td>
<td>4.4 Protecting the environment</td>
</tr>
<tr>
<td>5. Problem-solving</td>
<td>5.1 Solving technical problems</td>
</tr>
<tr>
<td></td>
<td>5.2 Identifying needs and technological responses</td>
</tr>
<tr>
<td></td>
<td>5.3 Creatively using digital technologies</td>
</tr>
<tr>
<td></td>
<td>5.4 Identifying digital competence gaps</td>
</tr>
<tr>
<td></td>
<td>5.5 Computational thinking**</td>
</tr>
<tr>
<td>6. Career-related competences</td>
<td>6.1 Operating specialised digital technologies for a particular field</td>
</tr>
<tr>
<td></td>
<td>6.2 Interpreting and manipulating data, information and digital content for a particular field</td>
</tr>
</tbody>
</table>

Once the Global content Framework was established, we carried out a mapping exercise to evaluate the extent to which the different concepts contained in the framework (i.e., competence areas and competences) can be operationalised with the instruments and procedures of existing digital literacy assessments. The digital literacy assessments evaluated were: OECD's Programme for the International Assessment of Adult Competencies (PIAAC) (OECD, 2012), the OECD's Programme for International Student Assessment (PISA) (OECD, 2019a), and the IEA International Computer and Information Literacy Study (ICILS) (Fraillon et al., 2019).
The mapping exercise identified PIAAC as the most valuable source of information for SGD indicator 4.4.2. PIAAC was chosen due to its conceptual framework (OECD, 2012), which showed the highest coverage of the topics relevant to this indicator. Additional reasons for the selection of PIAAC were that its target population covers the two groups mentioned in the indicator (youth and adults); as well as its potential to inform long-term monitoring. PIAAC is a programme of assessment and analysis of adult skills. This assessment measures the proficiency of adults from the age of 16 to 65 years in key information-processing skills (i.e., literacy, numeracy and problem-solving in technology-rich environments) and gathers information and data on how adults use their skills at home, at work and in the wider community.

The items used to operationalise SDG 4.4.2 were the ones corresponding to the PIAAC’s dimension of Problem-solving in technology-rich environments. This skill refers to the ability to use technology to solve problems and accomplish complex tasks. It is not a direct measure of computer literacy, as it also measures the capacity to operate within a digital environment to solve the types of problems that adults face in their everyday life as users of digital technologies (see OECD, 2012 for more details).

In PIAAC, Problem-solving in technology-rich environments is conceived along three dimensions (see Figure 1), measured with 16 tasks based on problem-solving scenarios.

![Figure 1. Core dimensions of problem-solving in technology-rich environments. Source: OECD (2012, p. 48).](image)

The performance of the participants in PIAAC is used to produce a proficiency scale (i.e., score) that ranges from 0 to 500. This scale is then divided into four proficiency levels based
on the knowledge and skills required to complete the tasks within those levels. Respondents at a particular level not only demonstrate knowledge and skills associated with that level but also the proficiencies required at lower levels. So, for example, respondents scoring at Level 2 are also proficient at Level 1.

To create the levels, an expert group in problem-solving in technology-rich environments met with psychometricians and test developers and reviewed data, looked at the tasks along the 500-point scale, and determined the requisite skills and knowledge to complete those tasks progressively increased along the scale.

By comparing the definition of SDG 4.4.2 and the description of the problem-solving in technology-rich environments, we identified level 2 as the threshold or cut-off point to estimate the proportion of respondents reaching the indicator within each country. At level 2, tasks typically require the use of both generic and more specific technology applications.

In what follows, we describe our analytical strategy, and, in order to aid the interpretation of the indicators, we present the definition of the cut-off points used to consider students to have reached the standards evaluated.

**Calculation method**

Since the test design for PIAAC is based on a variant of matrix sampling (using different sets of items, multistage adaptive testing, and different assessment modes) where each respondent was administered a subset of items from the total item pool. The responses to the subset of test items are scaled using IRT methodology and combined with other background information (provided by the respondent) and model parameters to produce a set of 10 plausible values (PVs). These PVs can be used to produce group-level estimations of proficiency values (OECD, 2013).

According to the PIAAC Technical Report (OECD, 2013), the following steps can be followed to calculate an estimate $\Theta$ of the proficiency values $\Theta$ using PVs and to calculate an estimate of the variance of $T$:

1. Using the first vector of plausible values for each respondent, evaluate $T$ as if the plausible values were the true values of $\Theta$. Denote the result $T_1$.

2. In the same manner as in step 1 above, evaluate the sampling variance of $T$, or $\text{Var}(T_1)$, with respect to respondents’ first vectors of plausible values. Denote the result $\text{Var}_1$.

3. Carry out steps 1 and 2 for the second through all 10 vectors of plausible values, thus obtaining $T_v$ and $\text{Var}_v$ for $v=2, \ldots, 10$.

4. The best estimate of $T$ obtainable from the plausible values is the average of the 10
values obtained from the different sets of plausible values:

\[ T = \frac{\sum_{u} T_{u}}{10} \]  

(1)

5. An estimate of the variance of \( T \) is the sum of two components: an estimate of \( \text{Var}(T_{u}) \) obtained as in step 4 and the variance among the \( T_{u} \)s:

\[ \text{Var}T = \frac{\sum_{n} \text{Var}_{u}}{10} + \left( 1 + \frac{1}{10} \right) \frac{\sum_{u}(T_{u} - T)^2}{10 - 1} \]  

(2)

The first component in \( \text{Var}(T) \) reflects uncertainty due to sampling from the population; the second component reflects uncertainty because the respondents' proficiencies \( \Theta \) are only indirectly observed.

Then, using the cut-off points established for the scale, the proportion of students respondents reaching the corresponding standard is estimated within each country or region as a simple proportion \( (P) \).

\[ P = \frac{X}{n} \]  

(3)

Where \( X \) is the number of respondents that reach the standard in each country and \( n \) is the total number of respondents in the same country.

**Data source**

The data was sourced from the Programme for the International Assessment of Adult Competencies (PIAAC). PIAAC, also known as the Survey of Adult Skills, is a large-scale international household study conducted under the auspices of the Organization for Economic Cooperation and Development (OECD) that assesses the key cognitive and workplace skills that adults need to participate successfully in 21st-century society and the global economy. The data has been collected in 40 countries/economies over three cycles between 2011 and 2017. However, the data reported here was available only for 31 countries: Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, Germany, Ireland, Japan, Korea, Rep. of, Netherlands, Norway, Poland, Russian Federation, Slovak Republic, Sweden, United Kingdom, Chile, Greece, Israel, Lithuania, New Zealand, Singapore, Slovenia, Turkey, Ecuador, Hungary, Kazakhstan, Mexico, Peru.
Definition of cut-off points (standards)
At the threshold, respondents typically require the use of both generic and specific technology applications. Adults at this level are typically able to use software they have never seen before to solve problems, even when unexpected impasses/outcomes occur. For example, they are likely able to:

- Figure out how to send an email message to a number of contacts using an unfamiliar bulk email function
- Use a sorting tool to make it easier to locate sales numbers for a specific product in a company spreadsheet
- Conduct a web search to find out how to solve a problem with other software, such as how to view a column that won't display properly in a spreadsheet
- Find an email message or file that has been “lost” somewhere on a computer hard drive
Table 2. Data disaggregation

<table>
<thead>
<tr>
<th>DEFINITION</th>
<th>METRICS</th>
<th>ITEM AND DESCRIPTION</th>
<th>CATEGORIES</th>
<th>INSTRUMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Nominal</td>
<td>Person resolved gender from Background questionnaire (derived)</td>
<td>Female, Male, Not stated or inferred (missing).</td>
<td>Background questionnaire (link)</td>
</tr>
<tr>
<td>Educational level</td>
<td>Ordinal</td>
<td>Which of the qualifications on this card is the highest you have obtained?</td>
<td>- No formal qualification or below ISCED 1</td>
<td>Background questionnaire (link)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Response categories were collapsed into 'Tertiary education' (ISCED 5A, 5B and 6);</td>
<td>- ISCED 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>'Non-tertiary education' (the rest).</td>
<td>- ISCED 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- ISCED 3C shorter than 2 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- ISCED 3C 2 years or more</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- ISCED 3A-B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- ISCED 3 (without distinction A-B-C, 2y+)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- ISCED 4C</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- ISCED 4 (without distinction A-B-C)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ISCED 5B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ISCED 5A, bachelor degree</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ISCED 5A, master degree</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ISCED 6</td>
<td></td>
</tr>
<tr>
<td>SES (parental</td>
<td>Ordinal</td>
<td>Highest of mother or father's level of education (derived)</td>
<td>- No formal qualification or below ISCED 1</td>
<td>Background questionnaire (link)</td>
</tr>
<tr>
<td>education)</td>
<td></td>
<td>*Response categories were collapsed into 'High SES' or at least one parent with</td>
<td>- ISCED 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tertiary education (ISCED 5A, 5B and 6); 'Low SES' or none of the parents with</td>
<td>- ISCED 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tertiary education (the rest).</td>
<td>- ISCED 3C shorter than 2 years</td>
<td></td>
</tr>
<tr>
<td>Definition</td>
<td>Metrics</td>
<td>Item and Description</td>
<td>Categories</td>
<td>Instrument</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
<td>----------------------</td>
<td>------------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| Age        | Ordinal | Person resolved age from Background Questionnaire (derived) | - 24 or less  
- 25-34  
- 35-44  
- 45-54  
- 55 plus  
- <16  
- >65  
- Not stated or inferred | Background questionnaire ([link](#)) |
Limitations
In very simple terms, cut-off scores refer to a point in a scale used to classify individuals, according to the level of the attribute being measured, between those above and below a threshold. As such, this threshold should represent a meaningful interpretation of the level of the attribute under study, in this case, “digital literacy skills”. In other words, individuals scoring above the threshold should be able to demonstrate “a minimum level of proficiency in digital literacy skills”. We have decided to follow the methodology proposed by the OECD to determine the thresholds for SDG 4.4.2. That is, we have selected proficiency level 2 of the scale “problem-solving in technology-rich environments” as the threshold or cut-off point. Additionally, we have provided a description of what this threshold means according to the PIAAC framework (e.g., the types of tasks that can be completed by adults who reach the threshold). The selection and interpretation of this particular threshold are, however, open to discussion among the relevant stakeholders (see OECD, 2013 for details on the methodology and description of the proficiency levels).

PIAAC data are uniquely suited to contribute to measuring SDG 4.4.2 because its methods ensure that comparable information is collected across all participating countries. This is a significant advantage compared to the alternative of compiling and harmonizing national datasets or developing a purpose-built study. However, it is important to keep in mind that PIAAC was not designed to measure SDG 4.4.2. For this reason, the information used here has limitations related to at least two areas: availability (e.g. the country coverage), and relevance (e.g. the scales produced here can only be considered as proxy measures of the concepts established in SDG 4.4.2).

Finally, it is important to consider that the “problem-solving in technology-rich environments” proficiency scores have some limitations related to the PIAAC design. As explained by PIAAC Reader’s Companion (OECD, 2019b, p. 76), the populations for whom these proficiency scores are reported are not identical across countries/economies. Proficiency scores relate only to the proportion of the target population in each participating country that was able to undertake the computer-based version of the assessment, and thus meets the preconditions for displaying competency in this domain. Four groups of respondents did not take the computer-based assessment, those who:

- indicated in completing the background questionnaire that they had never used a computer (group 1)
- had some experience with computers but who “failed” the ICT core assessment (see Chapter 3) designed to determine whether a respondent had the basic computer skills necessary to undertake the computer-based assessment (group 2)
- had some experience with computers but opted not to take the computer-based assessment (group 3)
- did not attempt the ICT core for literacy-related reasons (group 4).
By definition, a minimum level of competency in the use of computer tools and applications and a minimum level of proficiency in literacy and numeracy is required in order to display proficiency in “problem-solving in technology-rich environments”. Individuals in groups 1 and 2 are, thus, treated as not meeting the necessary preconditions for displaying proficiency and have no proficiency score in the domain of problem-solving in technology-rich environments. Respondents who did not attempt the ICT core for literacy-related reasons (group 4) have not been attributed a problem-solving score due to a lack of sufficient information. Respondents who opted not to take the computer-based assessment (group 3), however, represent a different category. They are individuals who, on their own initiative, decided to take the paper-and-pencil version of the assessment without going through the process designed to direct respondents to the computer-based or paper pathways of the assessment. As a result, it is not known whether or not they possessed the computer skills necessary to complete the computer-based assessment. Three options for how to treat this group were considered: imputing their proficiency scores on the basis of their proficiency in literacy and numeracy and their background characteristics; treating them as non-respondents; or reporting them as a separate category of the group that could not display competency. The latter option was adopted. Imputation was rejected on the grounds that refusals appeared to have different characteristics to respondents taking the computer-based assessment pathway. In fact, they appeared to be more similar to the respondents who did not have computer skills than to those who took the computer-based assessment. The option of treating them as non-respondents was rejected for similar reasons.

As a result of the limitations described above, there are missing values that are not addressed through imputation or weighting—as their characteristics are different from those that did complete the assessment. The estimates reported here assume that the individuals that, for any of the three reasons described above, did not complete the assessment did not reach the target established by SDG 4.4.2. We believe that this is a reasonable assumption since those individuals who have insufficient computer or literacy skills to answer the test are extremely unlikely to reach proficiency level 2 if they had taken the test. However, there is some degree of uncertainty due to the fact that they did not take the “problem-solving in technology-rich environments” assessment.
References


SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

4.4.3 Youth/adult educational attainment rates by age group and level of education

Definition
Distribution of the population aged 25 years and above according to the highest level of education attained or completed. This indicator is usually presented for age groups of at least 25 years and older in order to ensure that the majority of the population has completed their education. Younger age groups are often still enrolled in the education system. The indicator can be calculated for youth (15-24 years) if desired.

The indicator measures for each level of education the percentage of the population who completed at least that level of education. Education levels are defined according to the International Standard Classification of Education (ISCED).

Purpose
To show the educational composition of the population aged 25 years and above. This indicator reflects the structure and performance of the education system and informs policies to increase educational opportunity.

Calculation method
Divide the number of persons aged 25 years and above with respect to the highest level of education attained by the total population of the same age group and multiply the result by 100.

\[
EA^t_{Ag_i,n} = \frac{EAP^t_{Ag_i,n}}{p^t_{Ag_i}}
\]

where:

\(EA^t_{Ag_i,n}\) = percentage of population in age group \(i\) that attained educational level \(n\), in year \(t\)

\(EAP^t_{Ag_i,n}\) = population in age group \(i\) that attained educational level \(n\), in year \(t\)

\(p^t_{Ag_i}\) = population in age group \(i\), in year \(t\)
**Interpretation**
Educational attainment by the level of education provides an indication of the stock of knowledge, skills and competencies associated with completing that level. Differences in the distribution of attainment between different population groups can provide an indication of the current and historical effectiveness of the education system in promoting equal access to education.

**Type of data source**
National population census; household and/or labour force surveys.

**Disaggregation**
By age, sex, location and socio-economic status, level of education, and others as available in survey or census data. Disability status is not currently available in most household surveys and censuses.

The options for disaggregation may be limited by the sample size in a survey.

**Data required**
Populations in the relevant age groups (25 years and older, 15-24 years, other age groups if required) by the highest level of education completed.

**Data sources**
Population censuses and household surveys which collect data on the highest levels of education completed by members of a household, through self- or household declaration. In the former case, each household member above a certain age reports his or her own level of educational attainment. In the latter case, one person, usually the head of the household or another reference person, indicates the highest qualification held or level of education completed of each member of the household.

Labour force surveys are the most common source of data on educational attainment. International sample surveys, such as Demographic and Health Surveys (DHS, http://dhsprogram.com) or Multiple Indicator Cluster Surveys (MICS, http://mics.unicef.org), are another source. These surveys are designed to meet commonly agreed upon international data needs while also providing data for national policy purposes. These surveys are implemented on a regular basis in selected countries, on average every 3 to 5 years. They aim to assure cross-national comparability, although they often integrate national modules to suit specific country data needs. Modules from international surveys are sometimes added to other on-going national sample surveys.

Population censuses are another important source of attainment data but they are carried out less frequently than labour force surveys or other sample surveys, often only once per decade.
Data on attainment collected with surveys or censuses are usually mapped to ISCED levels postenumeration.

**Quality assurance**
This indicator should be based on complete and reliable census or survey data, applying clear classification of levels of education in accordance with ISCED.

**Limitations and comments**
Caution is required when using this indicator for cross-country comparison, since the countries do not always classify degrees and qualifications at the same ISCED levels, even if they are received at roughly the same age or after a similar number of years of schooling. Moreover, certain educational programmes and study courses cannot be easily classified according to ISCED, and segments of the population may be assigned an unknown level of educational attainment. In reporting educational attainment, this indicator only measures educational attainment in terms of the level of education attained and does not necessarily reveal the quality of the education.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintiles and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated

Definition
Parity indices require data for the specific groups of interest. They represent the ratio of the indicator value for one group to that of the other. Typically, the likely more disadvantaged group is the numerator. A value of exactly 1 indicates parity between the two groups.

Purpose
To measure the general level of disparity between two sub-populations of interest with regard to a given indicator.

Calculation method
The indicator value of the likely more disadvantaged group is divided by the indicator value of the other sub-population of interest.

\[
DPI = \frac{[Ind_d]}{[Ind_a]}
\]

where:
- \( DPI \) = the Dimension (sex, wealth, location, etc.) Parity Index.
- \( Ind_i \) = the indicator \( i \) for which an equity measure is needed.
- \( d \) = the likely disadvantaged group (e.g. female, poorest, rural, etc.).
- \( a \) = the likely advantaged group (e.g. male, richest, urban, etc.).

Interpretation
The further from 1 the parity index lies, the greater the disparity between the two groups of interest. For indicators that should ideally increase in values (e.g. gross enrolment ratios, completion rates, participation rates, etc), a parity index value less than 1 indicates disparity.
in favour of the advantaged group and a value higher than 1 indicates disparity in favour of the disadvantaged group. The interpretation of the parity index is the other way around for indicators that should ideally approach 0%, like out-of-school rates.

**Type of data source**
Various depending on underlying indicator.

**Disaggregation**
None because the parity indices directly compare two sub-populations of interest.

**Data required**
The indicator values for the sub-populations of interest.

**Data sources**
The sources are the same as for the underlying indicators for this goal.

**Quality assurance**
Quality assurance may vary according to the indicator for which the parity index is calculated, especially the data production process underlying the calculation of the indicator. In general, standards are set or are under development to harmonise data collection and international reporting and to ensure comparability of resulting indicators across country. Agencies responsible for maintaining the data used to produce the indicators implement these standards or protocols for quality proofing of national data and for documentation of data and related metadata to inform the use and interpretation of the resulting indicators.

**Limitations and comments**
The parity index does not indicate whether improvement or regression is due to the performance of one of the groups.
The default calculation method for the parity index yields an indicator that is not symmetrical around 1 and that has no upper limit. This limitation can be overcome with a simple transformation, by inverting ratios that exceed 1 and subtracting them from 2. This adjusted parity index is symmetrical around 1 and lies in the range 0-2, which makes interpretation easier. The adjusted parity index is calculated as follows:

\[
DPIA = \begin{cases} 
\frac{[Ind_i]_d}{[Ind_i]_a} & \text{if value for usually disadvantaged group } \leq \text{ value for usually advantaged group} \\
2 - \frac{1}{\frac{[Ind_i]_d}{[Ind_i]_a}} & \text{if value for usually disadvantaged group } > \text{ value for usually advantaged group} 
\end{cases}
\]

where:
- \( DPIA \) = the Dimension (sex, wealth, location, etc.) Parity Index, adjusted.
- \( Ind_i, d, \) and \( a \) are defined as for the unadjusted parity index.

Starting in September 2020, all parity indices disseminated by the UIS are calculated with the formula for adjusted parity indices.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

**Target 4.5** By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

**4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction**

**Definition**
Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction.

*Note that for the estimates derived from the student learning assessments, a proxy of language of instruction is used that is the language of the test.*

**Calculation method**
For learning assessment data, the indicator is defined as the percent of students who speak the language of the test more than “sometimes” or “never”, defined depending on the assessment (see Table 1). For assessment $i$, the measure of prevalence of learning in one’s own language $L_i$ in a particular country and sub-population would be defined as:

$$L_i = 100 \times E[l_i]$$  \hspace{1cm} (1)

where $l_i$ equals 1 if the student responded that he or she uses the language of the test more than “never” or “sometimes”, 0 if he or she used the language of test “never” or “sometimes”, and excluded if the student did not provide a valid answer. Table 1 presents the data sources, the questionnaire items used to develop the indicators, and the rules for determining whether a student is defined as learning in her or his home language or not.

**Interpretation**
For estimates using learning assessment data, the indicator provides the percent of students whose test language of test and language spoken at home are the same. This provides a
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

proxy to measure the percent of students learning in their home language as the language of the test is generally the language of instruction. However, it is not possible to verify (empirically) the actual language of instruction using learning assessments in this metadata as this data was not collected by these assessments. Earlier rounds of LLECE and SERCE did include a question on language of instruction; however, this assessment has not yet been added to the dataset used by UIS.

Disaggregation
By level of school, sex, urban or rural location and wealthiest and poorest 50 percent (see annex for details on definition of these sub-populations).

Metadata points: The metadata points indicate the source of data (Table 1 provides details for each data source). They also include standard errors and confidence intervals estimated based on the methodologies suggested by the assessment programme.

Data source: estimates provided by UNICEF based on MICS 6
Calculation method: Similar to equation (1), the estimation is based on the proportion of students reporting that the language used by teachers when teaching is equivalent to the most often language spoken at home. The population would be restricted to children currently attending primary school during the school year, as referred to in the MICS 6 questionnaire.

Measurement point definition: The definition of measurement points follows those used by the Global Alliance to Monitor Learning (GAML) for learning assessment data (see Table 1 below):
1. Grade 2 or 3: Plus one year when primary lasts more than 4 years according to ISCED levels in the country
2. End of primary: Plus or minus one year from the last year of primary according to ISCED level mapping in the country
3. End of lower secondary: Plus two or minus one of last year of lower secondary according to ISCED level mapping in the country

Note that MICS 6 is assigned to end of primary. Table 2 summarize the definition in MICS.
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Table 1. Data sources and questions on use of test language at home

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>TARGET POPULATION</th>
<th>LANGUAGE AT HOME QUESTIONS</th>
<th>RESPONSES AND MAPPING TO WHETHER THE STUDENT USES THE LANGUAGE OF THE TEST AT HOME (YES/NO/OMITTED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013 (TERCE)</td>
<td>6th grade students (end of primary)</td>
<td>At home, which language do you speak most of the time?</td>
<td>“Spanish or Portuguese”: yes All other valid responses: no Missing: omitted</td>
</tr>
</tbody>
</table>
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Table 1. Data sources and questions on use of test language at home

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>TARGET POPULATION</th>
<th>LANGUAGE AT HOME QUESTIONS</th>
<th>RESPONSES AND MAPPING TO WHETHER THE STUDENT USES THE LANGUAGE OF THE TEST AT HOME (YES/NO/OMITTED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PISA 2018</td>
<td>15 year-old secondary students (end of lower secondary)</td>
<td>What language do you speak at home most of the time? (please select one response)</td>
<td>“&lt;Language 1&gt;” “&lt;Language 2&gt;” “&lt;Language 3&gt;” “&lt;...etc.&gt;” “Other languages” Assignment of these responses to whether the student speaks the language of the test at home most of the time is done by the OECD and reported as a variable in the dataset.</td>
</tr>
<tr>
<td>SEA-PLM 2019</td>
<td>5th grade students (end of primary)</td>
<td>What language do you speak at home most of the time? Note if two languages are spoken at the same frequency, choose the one you learnt first.</td>
<td>“&lt;Language 1&gt;” “&lt;Language 2&gt;” “&lt;Language 3&gt;” “&lt;Language 4&gt;” “&lt;Other language&gt;” Assignment of these responses to whether the student speaks the language of the test at home most of the time is done by SEA-PLM and reported as a variable in the dataset.</td>
</tr>
</tbody>
</table>
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Table 2. Data sources and questions on used in MICS 6 to estimate percent of children learning in their home language

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>TARGET POPULATION</th>
<th>QUESTIONS ON LANGUAGE USED AT HOME AND LANGUAGE USED BY TEACHERS</th>
<th>RESPONSES AND MAPPING TO WHETHER THE STUDENT USES THE LANGUAGE OF THE TEST AT HOME (YES/NO/OMITTED)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICS 6</td>
<td>Children aged 5 to 17</td>
<td>FL.7 Which language do you speak most of the time at home? FL9A. What language do your teachers use most of the time when teaching you in class?</td>
<td>Mapped to yes if language answered in both questions is equal; no if unequal, and omitted if either of the two questions has a missing or invalid response</td>
</tr>
</tbody>
</table>
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Annex: metadata for sub-population definitions from the cross-national learning assessments

Definition of sub-populations

Female and male: The dataset used to estimate the indicator includes a question asking whether the student is male or female. For TIMSS, the administrative record of the sex of the student was used following how TIMSS reports learning achievement scores by sex.

Urban and rural: All assessments ask the school director about the type of location in which the school is located; however, only LLECE 2013 asks explicitly whether the school is located in an urban or rural area. The other surveys ask the question in various ways included the number of inhabitants or by description. See Table A.1 for the questions from each assessment and how they were mapped to urban or rural.

High and low socioeconomic status: All assessments, except TIMSS, provide a measure of the socioeconomic status of students (SES). This is typically based on the responses from students about assets at home as well as the education of parents. LLECE 2013 used the responses of the family questionnaire to generate its index. PASEC 2014 and PISA 2018 used student responses; no index was generated for the PASEC 2014 2nd grade students given their young age and reliability of answers. TIMSS reports an index of home learning resources based on household possessions reported by students and it was used as a measure of socioeconomic status. The SEA-PLM generates the index based on parental education and home resources.

To define high and low SES students, the median was calculated for each country, student above the median were defined as high SES while those below were defined as low SES. See Table A.2 for the names of the variables used to define high and low SES in each assessment.

Non-response and small sample sizes: Indicator estimates were not reported for sub-populations if data for the sub-population was available for less than 90 percent of the sampled students or if the number of observations for a particular sub-population was less than 100.

Standard errors and confidence intervals methodology
The suggested methodology for estimating standard errors and subsequent confidence intervals varies by assessment and aims to account for clustering at the school-level. All surveys suggest using replicate methods in which the sample variation is obtained from
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

variously defined sub-samples that mimic the sample design; the variation in estimates among the replicates provides an estimate of the sampling variation. The suggested methods were used for all assessments except LLECE 2013. For this survey, replicate weights were provided with each of the learning achievement datasets; however, a large number of students in the background dataset (which included the responses to the bullying and home language questions) were not included in the student achievement dataset. In order to maximize the background data, a linearization method for estimating the standard errors robust to clustering at the school level was used. Table A.3 describes the methodology used for each assessment.
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Table A.1. Definition of urban and rural sub-populations

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Population</th>
<th>Question</th>
<th>Responses (mapping)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Grades 3 and 6</td>
<td>How would you characterize the area where your school is located?</td>
<td>In an area considered rural (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In an area considered urban (urban)</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grades 2 and 6</td>
<td>Your school is located in...</td>
<td>A town (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A suburb of a big city (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A big village (hundreds of homesteads) (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A small village (dozens of homesteads) (rural)</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>15 year-olds</td>
<td>Which of the following definitions best describes the community in which your school is located?</td>
<td>A village, hamlet or rural area (fewer than 3 000 people) (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A small town (3 000 to about 15 000 people) (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A town (15 000 to about 100 000 people) (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A city (100 000 to about 1 000 000 people) (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A large city (with over 1 000 000 people) (urban)</td>
</tr>
<tr>
<td>SEA-PLM 2019</td>
<td>Grade 5</td>
<td>Which of the following characteristics best describes the community in which your school is located?</td>
<td>A village, or rural area (fewer than 3 000 people) (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A small town (3 000 to about 15 000 people) (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A town (15 000 to about 100 000 people) (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A city (100 000 to about 1 000 000 people) (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A large city (with over 1 000 000 people) (urban)</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>Grades 4 and 8</td>
<td>Which best describes the immediate area in which your school is located?</td>
<td>Urban–Densely populated (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suburban–On fringe or outskirts of urban area (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium size city or large town (urban)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Small town or village (rural)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Remote rural (rural)</td>
</tr>
</tbody>
</table>
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Table A.2. Variables used to define high and low socioeconomic status of students

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Population</th>
<th>Variable</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Grades 3 and 6</td>
<td>Index of the family’s socioeconomic status (isecf)</td>
<td>Parents</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grade 2</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grade 6</td>
<td>Socioeconomic index of the student’s family (ses)</td>
<td>Students</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>15 year-olds</td>
<td>Index of economic, social and cultural status (escs)</td>
<td>Students</td>
</tr>
<tr>
<td>SEA-PLM 2019</td>
<td>Grade 5</td>
<td>Socioeconomic status index (ses)</td>
<td>Students and parents</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>4th grade</td>
<td>Index of home resources for learning (asbghrl)</td>
<td>Students</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>8th grade</td>
<td>Index of home educational resources (bsbgher)</td>
<td>Students</td>
</tr>
</tbody>
</table>
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

Table A.3. Methodology for calculating standard errors by assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Method</th>
<th>Reference for formulas</th>
<th>Software routine</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Linearized</td>
<td>StataCorp 2013</td>
<td>SVY module for Stata (StataCorp)</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Jackknife repeated replication</td>
<td>PASEC 2017</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>Balanced repeated replication</td>
<td>OECD 2009</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td>SEA-PLM 2019</td>
<td>Jackknife repeated replication</td>
<td>SEA-PLM 2020</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>Jackknife repeated replication</td>
<td>Foy &amp; LaRoche (2016)</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
</tbody>
</table>
4.5.2 Percentage of students in a) early grades, b) at the end of primary, and c) at the end of lower secondary education who have their first or home language as language of instruction

References


SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Metadata

Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.5.3 Existence of funding mechanisms to reallocate education resources to disadvantage populations

Definition

First, overall education financing mechanisms refer to resource allocation mechanisms from the central to lower tiers of government, mainly to cover salaries and operational needs. Typically, the budget is allocated from the centre to local governments based on the school-age population and a unit cost per student. To promote equity, allocations may be adjusted, taking factors such as poverty and location into account. In more centralized systems, the budget may be organized along line items, some of which may specifically address the education needs of disadvantaged groups.

Second, while schools may be reached directly through the first mechanism, some countries provide further resources to schools for development purposes. Some of these programmes also try to compensate schools that are in a disadvantaged area and/or have disadvantaged students. They tend to be block grants, in addition to the capitation grants, and may provide cash or cover specific expenditure types (e.g., equipment purchases, teacher training).

Third, the education ministry may lead policies and programmes that provide resources to disadvantaged students and their families. These may be exemptions from fee payments or come in the form of cash (e.g., scholarships, although many such schemes are merit-based and not equity-oriented), or kind (e.g., targeted school meal programmes).

Fourth, social protection ministries lead policies and programmes that provide cash to disadvantaged students and families to help improve their education opportunities. Their targeting mechanisms tend to be well articulated and regularly evaluated.

Three dimensions assess the extent to which these four mechanisms reallocate resources:

- **Comprehensiveness**: Does a policy exist and how extensive are its criteria to target disadvantaged groups?
4.5.3 Existence of funding mechanisms to reallocate education resources to disadvantage populations

- **Coverage**: What is the share of schools, students and/or households reached by the main policy or programme?
- **Volume**: What is the share of total public education expenditure allocated for the main policy or programme or what is the size of the average transfer under this policy or programme expressed in some relative measure (e.g., percentage of GDP or per capita household income)?
Where there was more than one programme, the larger one was analysed.

**Purpose**: This indicator aims to look at the efforts countries make to reduce disparity in education. A large range of policies contributes to equity; this indicator focuses on the subset of financing policies and their respective programs. Its purpose is formative: to generate interest to collect more information on this important issue and help countries design better policies in the future.

**Data required**: Policy documents from national and international sources.

**Data sources**: The information has been collected by the Global Education Monitoring Report (GEMR) team from national sources, such as budget statements, accounts, education sector plans and reports of national governments and reports of international organizations.

**Estimation method**: The indicator is binary (No/Yes). An education system is classified as ‘equity-oriented (i.e. Yes)’ if at least five medium or high scores were assigned in eight categories described in Table 1.

**Disaggregation**: None

**Limitations**: There are three main limitations:

1. Information may not be up to date or accurately reported;
2. There is no proof that the empirical thresholds used to distinguish the levels of efforts are associated with effectiveness in promoting equity. Even with the right foundation, some policies and programs may not reduce disparity in education;
3. Rating comprehensiveness, coverage and volume of policy intent is necessary but not sufficient. Complementary contextual information is needed, e.g., degree of decentralization; budget structure; co-financing with other ministries; donors dependence and sustainability; administration weaknesses or design faults that compromise policy and program implementation.

Updated February 2021
4.5.3 Existence of funding mechanisms to reallocate education resources to disadvantage populations

Table 1. Criteria used to classify the equity focus of financing policies and programmes

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall education financing mechanism</td>
<td>Coverage</td>
<td>&lt;30%</td>
<td>30–70%</td>
</tr>
<tr>
<td></td>
<td>Share of school-age population</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td>&lt;25%</td>
<td>25–50%</td>
</tr>
<tr>
<td></td>
<td>Share of total public education spending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Resources to schools / 3. Resources to students (education)</td>
<td>Coverage</td>
<td>&lt;2% or &gt;50%</td>
<td>2–10% or 25–50%</td>
</tr>
<tr>
<td></td>
<td>Share of school-age population</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td>&lt;2%</td>
<td>2–10%</td>
</tr>
<tr>
<td></td>
<td>Share of total public education spending</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Share of total public spending</td>
<td>&lt;0.3%</td>
<td>0.3–1.5%</td>
</tr>
<tr>
<td></td>
<td>Share of GDP</td>
<td>&lt;0.1%</td>
<td>0.1–0.4%</td>
</tr>
<tr>
<td></td>
<td>If information is not available</td>
<td>Non-compulsory education</td>
<td>Only part of compulsory education</td>
</tr>
<tr>
<td>4. Resources to students (social)</td>
<td>Coverage</td>
<td>&lt;5%</td>
<td>5–15%</td>
</tr>
<tr>
<td></td>
<td>Share of school-age population</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Share of total population</td>
<td>&lt;2%</td>
<td>2–8%</td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td>&lt;0.5%</td>
<td>0.5–1%</td>
</tr>
<tr>
<td></td>
<td>Share of total public spending</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Share of GDP</td>
<td>&lt;0.01%</td>
<td>0.01–0.1%</td>
</tr>
<tr>
<td></td>
<td>If information is not available</td>
<td>Any other programme</td>
<td>Child grant or social assistance programme for families with school-aged children</td>
</tr>
</tbody>
</table>

Source: GEM Report team.

Updated February 2021
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.5.4 Education expenditure per student by level of education and source of funding

Definition
Total initial funding from government (central, regional, local), private (households and other private) and international sources for a given level of education (pre-primary, primary, lower secondary, upper secondary, post-secondary non-tertiary and tertiary education) per student enrolled at that level in a given year. The results should be expressed (i) as a percentage of GDP per capita; and (ii) in PPP$ (constant). Unless an additional disaggregation is proposed, this indicator considers funding for public and private institutions together.

Purpose
This indicator reflects the amount of resources invested on average in a single student, going beyond government sources so that an actual unit cost can be calculated. Using a per student basis is useful for comparison, whether between levels of education, over time, or between countries. Expressing the indicator either as percentage of GDP per capita, or in PPP$, also allows for comparisons between countries, and using constant values when looking at time-series is necessary to evaluate how real (eliminating the effects of inflation) resources are evolving over time.

Calculation method
The percentage of the total initial funding (i.e. including transfers paid but excluding transfers received) from government (central, regional, local), private (households and other private) or international sources for a given level of education (pre-primary, primary, lower secondary, upper secondary, post-secondary non-tertiary and tertiary education) out of the number of students enrolled at that level in a given year. The result is divided (i) by GDP per capita; and (ii) by the PPP$ conversion factor.

\[ X_{GDPpc,n,s} = \frac{X_{n,s}}{E_n \times GDPpc} \]
\[
X_{n,s}^{PPPconst} = \frac{X_{n,s}}{E_n \times PPPconst}
\]

where:

- \(X_{n,s}^{PPPconst}\) = expenditure per student in level \(n\) of education from source \(s\) of funding in constant PPP$.
- \(X_{n,s}\) = expenditure per student in level \(n\) of education from source \(s\) of funding as a percentage of GDP per capita.
- \(E_n\) = enrolment in level \(n\) of education.
- \(GDP_{pc}\) = GDP per capita.
- \(PPPconst\) = PPP constant $ conversion factor.

**Interpretation**

**Government funding:** When considered as a percentage of GDP per capita, a higher value would indicate a greater priority to the specific level of education given by public authorities. When considered in PPP$, the indicator can show the 'real' amount of resources invested in one student.

**Private/household funding:** a higher value would signify a greater burden on households, and potential implications for equity and access to education.

**For international sources:** a higher value would signify a greater commitment from donors to a level of education in a given country, but also potentially a greater degree of aid dependency for governments in terms of education funding.

For all sources combined: the indicator would show the real, total value of resources invested in one student, and therefore the real unit cost. Since the indicator is constructed on a comparable scale (i.e. for one student, and relative to GDP per capita or using a common currency), all its sub-components can be compared to other levels of education, over time, or between countries.

**Type of data source**

Financial data from ministries of finance and/or education (government); household expenditure surveys (households); national aid management systems and/or IATI (international); other surveys (other private); administrative data (number of students by level).

**Disaggregation**

By level of education, source of funding (government, private, international), type of institution (public/private) but with expected lower coverage for private institutions. For household expenditure, eventually disaggregation by wealth, location and sex could also be calculated, but not for government and international sources.
Data required
Central, regional and local government expenditure data on education by level of education and type of institution; household and (ideally) other private expenditure on education by level of education and type of institution; international expenditure on education by level of education and type of institution; number of students enrolled by level of education and type of institution.

Data sources
At the national level, ministries of finance and/or ministries of education financial management systems are the source of government expenditure on education, although disaggregation by level often implies estimations using data on students and/or teachers by level. Data on expenditure by lower levels of government can be centralized or collected directly from local authorities.

Household expenditure on education is collected through consumption/expenditure surveys, although few surveys disaggregate spending by level of education, type of school and/or nature of expenditure. School censuses in some countries also collect data on financial/in-kind contributions by households/students.

Household expenditure on education, for calculation of the private component of the indicator, is collected through a wide variety of surveys, including Living Standards Measurement Studies (LSMS) and household budget surveys. These surveys differ in the amount and type of information they collect – including disaggregation by level of education, type of school, or nature of expenditure – and spending data are not always comparable. In some countries, school censuses collect data on financial/in-kind contributions by households/students.

To support the collection of high-quality data, the UIS and the World Bank (2018) have published a guidebook on designing and implementing household surveys that include measurement of expenditure on education. The guidebook provides a standardized set of guidelines to foster the harmonization of education-expenditure data in household surveys, and to ensure that the data collected are more easily comparable across surveys and countries and are sufficiently comprehensive while acknowledging country-specific needs. Data on other private sources of funding for education (e.g. corporations, local NGOs) are rarely collected systematically and would often require additional surveys proceeded by significant analytical, preparatory and advocacy work.

International sources may be available through governmental financial systems when they are recorded on-budget, and off-budget international funding may sometimes be available through governmental aid management systems, although rarely with the disaggregation needed (ex. by level of education). Data sources for international funding, such as the OECD-DAC database or the International Aid Transparency Initiative (IATI) may be used as a
complement, but often present problems of compatibility with other sources, such as government records.

**Quality assurance**
The indicator should be calculated from comprehensive data on enrolment and education expenditure from government, private, and international sources for all levels of education covered by the indicator, for all types of institutions combined, and with matching data on GDP per capita and PPP constant $ conversion factor. The UIS maintains a global database on enrolment and total initial expenditures by level of education, and defines the protocols and standards for data reporting by countries. The International Monetary Fund (IMF) produces and maintains data on GDP per capita and PPP constant $ conversion factor.

**Limitations and comments**
The difference between ‘initial funding’ (where the funds originally came from) and ‘final expenditure’ (which entity carries out the expenditure and sends the funds to the school) is important to clarify in this type of indicator. For example, where international donors transfer funds to the ministry of education budget without earmarking for specific activities (such as through sector budget support), the expenditure is done by the government, but the funding comes from international sources. Same thing with a scholarship: the initial funder is the government, and the final spender is the household. Either two sets of indicators should eventually be produced (potentially confusing to users), or a choice be made on which perspective will be presented. The option presented here (and to be discussed and validated) is to calculate the indicator on the basis of initial funding because a) This is arguably more intuitive--if we are saying ‘by source of funds’, people expect to see who paid and b) This would be better aligned with the National Education Accounts methodology. Note that if we go with that option, we may want to change the indicator name to something like “Education funding per student by level of education and source”.

The part of this indicator focusing on government expenditure is already available for a large number of countries, although not always with regularity. The formula would also need to be slightly modified if we are to use initial funding.

For private and international sources, data availability is significantly lower, so that it will take several years and significant investment to increase coverage to an acceptable level. In the medium-term, ‘private’ expenditure may have to be limited to households only (and only for a few countries), and international sources to those recorded in government budgets. The lack of data on household sources is especially important to consider when looking at expenditure in private institutions, where fees tend to be much higher.

**References**
Target 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

4.5.5 Percentage of total aid to education allocated to least developed countries

Definition
Total gross official development assistance (ODA) for education in least developed countries (including early childhood, primary, secondary, post-secondary non-tertiary and tertiary education) as well as scholarships and student costs in donor countries expressed as a percentage of total gross official development assistance to education. Least developed countries are those defined by the UN Office of the High Representative for Least Developed Countries, Landlocked States and Small Island Developing States (UN-OHRLLS) (http://www.un.org/en/development/desa/policy/cdp/ldc/ldc_list.pdf). Only donor countries will be required to report this indicator.

Official development assistance is defined as grants or loans to countries and territories and to multilateral institutions provided by state and local governments or their executive agencies with the objective of promoting the economic development and welfare of developing countries and territories. Such grants or loans are provided on concessional financial terms and, in the case of loans, contain a grant element of at least 25 per cent.

Purpose
ODA is the accepted measure of international development co-operation. The data thus cover official international assistance to education, including to provide education places for developing country nationals in donor country educational institutions.

Calculation method
Total gross disbursements for the education sector allocated to least developed countries are expressed as a percentage of total bilateral aid for education.

\[ PODAE_{LDC} = \frac{ODAE_{LDC}}{ODAE} \]
where:

\[ P_{ODAE_{LDC}} = \text{percentage of gross ODA for education allocated to least developed countries} \]

\[ ODAE_{LDC} = \text{total gross ODA for education allocated to least developed countries} \]

\[ ODAE = \text{total gross ODA for education} \]

**Interpretation**

A high value indicates that least developed countries are being prioritised to receive aid for education.

**Type of data source**

Administrative data.

**Disaggregation**

The data can be disaggregated by provider and recipient country.

**Data required**

Total aid to education and aid to education allocated to least developed countries.

**Data sources**

Administrative data from donor countries and other aid providers on gross official development assistance to education.

**Quality assurance**

The Development Assistance Committee (DAC) of the Organization for Economic Co-operation and Development (OECD) compiled data used to produce this indicator based on returns submitted by its member countries and other aid providers. DAC-OECD defines the protocol for reporting these data.

**Limitations and comments**

The data only address international concessional flows provided by governments.
SDG indicator metadata
(Harmonized metadata template - format version 1.0)

0. Indicator information

0.a. Goal
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

0.b. Target
Target 4.6: By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

0.c. Indicator
Indicator 4.6.1: 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

0.d. Series
Not applicable.

0.e. Metadata update
March 2020

0.f. Related indicators
1.2, 1.5, 2.1, 2.2, 2.3, 3.1, 3.3, 3.4, 3.7, 4.5, 5.3, 5.4, 5.5, 5.6, 8.5, 8.6, 8.b, 10.2, 12.8, 13.3, 13.b

0.g. International organisations(s) responsible for global monitoring
UNESCO Institute for Statistics (UNESCO-UIS)

1. Data reporter

1.a. Organisation
UNESCO Institute for Statistics (UNESCO-UIS)

2. Definition, concepts, and classifications

2.a. Definition and concepts
Definition:
The proportion of youth (aged 15-24 years) and of adults (aged 15 years and above) who have achieved or exceeded a fixed level of proficiency in (a) literacy and (b) numeracy.
Concepts:
The **fixed level of proficiency (FLP)** is the benchmark of basic knowledge in a domain (literacy or numeracy) measured through learning assessments. Currently, the FLP for global reporting is PIAAC level 2 descriptor. The concepts of functional literacy and functional numeracy are based on the UNESCO definitions, which cover a continuum of proficiency levels rather than a dichotomy. A person is functionally literate if he/she can engage in all those activities in which literacy is required for the effective functioning of his/her group and community and also which enables them to continue to use reading, writing and calculation for his/her own and the community’s development.

2.b. Unit of measure

This indicator is expressed as proportion of youth and of adults who have achieved or exceeded a fixed level of proficiency in (a) literacy and (b) numeracy.

2.c. Classifications

**Fixed levels of proficiency in literacy and numeracy:**

**Literacy:**
At this level, the medium of texts may be digital or printed, and texts may comprise continuous, non-continuous, or mixed types. Tasks at this level require respondents to make matches between the text and information, and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require the respondent to
- cycle through or integrate two or more pieces of information based on criteria;
- compare and contrast or reason about information requested in the question; or
- navigate within digital texts to access and identify information from various parts of a document.

**Numeracy:**
Tasks at this level require the respondent to identify and act on mathematical information and ideas embedded in a range of common contexts where the mathematical content is fairly explicit or visual with relatively few distractors. Tasks tend to require the application of two or more steps or processes involving calculation with whole numbers and common decimals, percents and fractions; simple measurement and spatial representation; estimation; and interpretation of relatively simple data and statistics in texts, tables and graphs.

Level 2 of PIAAC was adopted as the global definition of Fixed Level of Proficiency (FLP) in literacy and numeracy as presented in the following tables.
<table>
<thead>
<tr>
<th>Level</th>
<th>Types of tasks completed successfully at each level of proficiency</th>
<th>FLP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Level 1</td>
<td>The tasks at this level require the respondent to read brief texts on familiar topics to locate a single piece of specific information. There is seldom any competing information in the text and the requested information is identical in form to information in the question or directive. The respondent may be required to locate information in short continuous texts. However, in this case, the information can be located as if the text were non-continuous in format. Only basic vocabulary knowledge is required, and the reader is not required to understand the structure of sentences or paragraphs or make use of other text features. Tasks below Level 1 do not make use of any features specific to digital texts.</td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>Most of the tasks at this level require the respondent to read relatively short digital or print continuous, non-continuous, or mixed texts to locate a single piece of information that is identical to or synonymous with the information given in the question or directive. Some tasks, such as those involving non-continuous texts, may require the respondent to enter personal information onto a document. Little, if any, competing information is present. Some tasks may require simple cycling through more than one piece of information. Knowledge and skill in recognising basic vocabulary determining the meaning of sentences, and reading paragraphs of text is expected.</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>At this level, the medium of texts may be digital or printed, and texts may comprise continuous, non-continuous, or mixed types. Tasks at this level require respondents to make matches between the text and information and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require the respondent to • cycle through or integrate two or more pieces of information based on criteria; • compare and contrast or reason about information requested in the question; or • navigate within digital texts to access and identify information from various parts of a document.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table: Description of proficiency levels in literacy
<table>
<thead>
<tr>
<th>Level</th>
<th>Types of tasks completed successfully at each level of proficiency</th>
<th>FLP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3</td>
<td>Texts at this level are often dense or lengthy, and include continuous, non-continuous, mixed, or multiple pages of text. Understanding text and rhetorical structures become more central to successfully completing tasks, especially navigating complex digital texts. Tasks require the respondent to identify, interpret, or evaluate one or more pieces of information, and often require varying levels of inference. Many tasks require the respondent to construct meaning across larger chunks of text or perform multi-step operations in order to identify and formulate responses. Often tasks also demand that the respondent disregard irrelevant or inappropriate content to answer accurately. Competing information is often present, but it is not more prominent than the correct information.</td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td>Tasks at this level often require respondents to perform multiple-step operations to integrate, interpret, or synthesise information from complex or lengthy continuous, non-continuous, mixed, or multiple type texts. Complex inferences and application of background knowledge may be needed to perform the task successfully. Many tasks require identifying and understanding one or more specific, non-central idea(s) in the text in order to interpret or evaluate subtle evidence-claim or persuasive discourse relationships. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent. Competing information is present and sometimes seemingly as prominent as correct information.</td>
<td></td>
</tr>
<tr>
<td>Level 5</td>
<td>At this level, tasks may require the respondent to search for and integrate information across multiple, dense texts; construct syntheses of similar and contrasting ideas or points of view; or evaluate evidence-based arguments. Application and evaluation of logical and conceptual models of ideas may be required to accomplish tasks. Evaluating reliability of evidentiary sources and selecting key information is frequently a requirement. Tasks often require respondents to be aware of subtle, rhetorical cues and to make high-level inferences or use specialised background knowledge.</td>
<td></td>
</tr>
</tbody>
</table>

Note: STEP uses the same methodology as PIAAC
## Table: Description of proficiency levels in numeracy

<table>
<thead>
<tr>
<th>Level</th>
<th>Types of tasks completed successfully at each level of proficiency</th>
<th>MLP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Below Level 1</strong></td>
<td>Tasks at this level require the respondents to carry out simple processes such as counting, sorting, performing basic arithmetic operations with whole numbers or money, or recognising common spatial representations in concrete, familiar contexts where the mathematical content is explicit with little or no text or distractors.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 1</strong></td>
<td>Tasks at this level require the respondent to carry out basic mathematical processes in common, concrete contexts where the mathematical content is explicit with little text and minimal distractors. Tasks usually require one-step or simple processes involving counting, sorting, performing basic arithmetic operations, understanding simple percents such as 50%, and locating and identifying elements of simple or common graphical or spatial representations.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>Tasks at this level require the respondent to identify and act on mathematical information and ideas embedded in a range of common contexts where the mathematical content is fairly explicit or visual with relatively few distractors. Tasks tend to require the application of two or more steps or processes involving calculation with whole numbers and common decimals, percents and fractions; simple measurement and spatial representation; estimation; and interpretation of relatively simple data and statistics in texts, tables and graphs.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Level 3</strong></td>
<td>Tasks at this level require the respondent to understand mathematical information that may be less explicit, embedded in contexts that are not always familiar and represented in more complex ways. Tasks require several steps and may involve the choice of problem-solving strategies and relevant processes. Tasks tend to require the application of number sense and spatial sense; recognising and working with mathematical relationships, patterns, and proportions expressed in verbal or numerical form; and interpretation and basic analysis of data and statistics in texts, tables and graphs.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 4</strong></td>
<td>Tasks at this level require the respondent to understand a broad range of mathematical information that may be complex, abstract or embedded in unfamiliar contexts. These tasks involve undertaking multiple steps and choosing relevant problem-solving strategies and processes. Tasks tend to require analysis and more complex reasoning about quantities and data; statistics and chance; spatial relationships; and change, proportions and formulas. Tasks at this level may also require understanding arguments or communicating well-reasoned explanations for answers or choices.</td>
<td></td>
</tr>
<tr>
<td><strong>Level 5</strong></td>
<td>Tasks at this level require the respondent to understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. Respondents may have to integrate multiple types of mathematical information where considerable translation or interpretation is required; draw inferences; develop or work with mathematical arguments or models; and justify, evaluate and critically reflect upon solutions or choices.</td>
<td></td>
</tr>
</tbody>
</table>

Note: STEP uses the same methodology as PIAAC
3. Data source type and data collection method

3.a. Data sources

This indicator is collected via skills’ assessment surveys of the adult population (e.g., PIAAC, STEP, LAMP, RAMAA) and national adult literacy surveys.

3.b. Data collection method

Data are collected from the respective organizations responsible for each assessment.

3.c. Data collection calendar

Various depending on survey and country.

3.d. Data release calendar

Data is released by the UIS in February/March and September every year.

3.e. Data providers

This indicator is collected via skills national or international assessment surveys of youth and adult populations. OECD’s Survey of Adult Skills in its Programme for the International Assessment of Adult Competencies (PIAAC) and the World Bank’s Skills Towards Employment and Productivity (STEP) measurement programme, both based on the PIAAC framework and scale, and bodies responsible for conducting national learning assessments (including Ministries of Education, National Statistical Offices and other data providers) are sources of data of this indicator.

3.f. Data compilers

UNESCO Institute for Statistics

3.g. Institutional mandate

The UNESCO Institute for Statistics (UIS) is the statistical branch of the United Nations Educational, Scientific and Cultural Organization (UNESCO). The Institute produces internationally comparable data and methodologies in the fields of education, science, culture and communication for countries at all stages of development.

The Education 2030 Framework for Action 100 has clearly states that: “In recognition of the importance of harmonization of monitoring and reporting, the UIS will remain the official source of cross-nationally comparable data on education. It will continue to produce international monitoring indicators based on its annual education survey and on other data sources that guarantee international comparability for more than 200 countries and territories. In addition to collecting data, the UIS will work with partners to develop new
indicators, statistical approaches and monitoring tools to better assess progress across the targets related to UNESCO’s mandate, working in coordination with the SDG-Education 2030 SC”

4. Other methodological considerations

4.a. Rationale

The indicator is a direct measure of the skill levels of youth and adults in the two areas: literacy and numeracy.

4.b. Comment and limitations

Functional literacy and numeracy are related to context thus survey programs need further development in order to frame questions in a way that are meaningful to different economic and social-settings and could be more efficient to reflect population level of skills.

4.c. Method of computation

Proportion of youth and adults who have achieved at least a fixed level of proficiency as defined for large-scale (sample representative) adult literacy and numeracy assessments:

\[ PFLP_{t,a,d} = \frac{FLP_{t,a,d}}{P_{t,a,d}} \]

where:

- \( PFLP_{t,a,d} \) = the proportion of people in a skills survey in age group \( a \), in year \( t \), who have achieved or exceeded the fixed level of proficiency in domain \( d \).
- \( FLP_{t,a,d} \) = the number of people in a skills survey in age group \( a \), in year \( t \), who have achieved or exceeded the fixed level of proficiency in domain \( d \).
- \( P_{t,a,d} \) = the total number of people in age group \( a \), in year \( t \), who participated in the skills survey of domain \( d \).
- \( a = 16-65 \) years (youth and adults)
- \( d \) = the domain which was assessed (literacy or numeracy)

4.d. Validation

In each data update period, surveys of recent publications of results of national and international assessments are carried out. Then, consultations are made with national references and UIS technical focal points to verify the availability and validity of the data.

4.e. Adjustments

Not applicable
4.f. Treatment of missing values (i) at country level and (ii) at regional level

- At country level
  None by data compiler.

- At regional and global levels
  None by data compiler.

4.g. Regional aggregations

Regional and global aggregates are not currently available for this indicator.

4.h. Methods and guidance available to countries for the compilation of the data at the national level

The UIS has elaborated guidance for the countries regarding the contents, the procedures and the reporting in the Global Alliance to Monitor Learning [microsite](#).

4.i. Quality management

The UIS maintains a global database on learning assessments. The inclusion of a data point in the database to show transparency is completed by following a protocol and is reviewed by UIS technical focal points to ensure consistency and overall data quality, based on objective criteria to ensure that only the most recent and reliable information are included in the database.

4.j Quality assurance

OECD is the data compiler for PIAAC and the World Bank Group is the compiler for STEP, both used the PIAAC framework and skills level descriptors.

4.k Quality assessment

The criteria to ensure the quality and standardization of the data are: the data sources must include adequate documentation; data values should be representative at the national population level and should otherwise be included in a footnote; data values are based on a sufficiently large sample; and the data are plausible and based on trends and consistency with previously published or reported estimates for the indicator.

5. Data availability and disaggregation

Data availability:
45 countries with at least one data point for the period 2010-2017.

Time series:
2006 onwards.
Disaggregation:
Indicators are published disaggregated by age group, sex, socio-economic status, and immigration status, as available. Parity indexes are estimated in the reporting of Indicator 4.5.1. Information on the disaggregation of variable for Indicator 4.6.1 are presented in the following table.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Definition</th>
<th>Categories</th>
<th>Item and component description</th>
<th>Parity index (PI)</th>
<th>Relevant Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIAAC</td>
<td>Sex of respondent</td>
<td>2</td>
<td>Is the respondent male or female? Answer options: Female, Male</td>
<td>Female/Male</td>
<td><a href="https://www.oecd.org/skills/piaac/Complementary%20information%20from%20the%20Background%20Questionnaire.pdf">Link</a></td>
</tr>
<tr>
<td>STEP</td>
<td>Sex of respondent</td>
<td>2</td>
<td>Is the respondent male or female? Answer options: Female, Male</td>
<td>Female/Male</td>
<td><a href="http://documents.worldbank.org/curated/en/516741468178736065/STEP-skills-measurement-surveys-innovative-tools-for-assessing-skills">Link</a></td>
</tr>
<tr>
<td>Assessment</td>
<td>Definition</td>
<td>Categories</td>
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</tr>
<tr>
<td><strong>Socio-economic status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIAAC</td>
<td>Education parents. Reporting categories</td>
<td>Two categories</td>
<td>What was the highest level of education your father/mother or male/female guardian ever completed? Primary or lower secondary education, Upper secondary education and Tertiary education. Two categories are tabulated for this indicator: i) Neither parents has attained tertiary and ii) At least one parent has attained tertiary</td>
<td>Neither parents has attained tertiary/At least one parent has attained tertiary</td>
<td><a href="https://www.oecd.org/skills/piaac/PIAAC(2011_11)MS_BQ_ConceptualFramework_1%20Dec%202011.pdf">https://www.oecd.org/skills/piaac/PIAAC(2011_11)MS_BQ_ConceptualFramework_1%20Dec%202011.pdf</a></td>
</tr>
<tr>
<td>STEP</td>
<td>Education parents. Reporting categories</td>
<td>Two categories</td>
<td>What was the highest level of education your father/mother or male/female guardian ever completed? Primary or lower secondary education, Upper secondary education and Tertiary education. Two categories are tabulated for this indicator: i) Neither parents has attained tertiary and ii) At least one parent has attained tertiary</td>
<td>Neither parents has attained tertiary/At least one parent has attained tertiary</td>
<td></td>
</tr>
<tr>
<td><strong>Immigration status</strong></td>
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PIAAC: Programme for the International Assessment of Adult Competencies
STEP: Skills Towards Employment and Productivity
6. Comparability / deviation from international standards

Sources of discrepancies:
None.

7. References and Documentation

URL:
http://www.uis.unesco.org/Pages/default.aspx

References:
Programme for the International Assessment of Adult Competencies (PIAAC):
http://www.oecd.org/site/piaac/


Action Research: Measuring Literacy Programme Participants’ Learning Outcomes (RAMAA):
https://uil.unesco.org/literacy-and-basic-skills/assessment-and-monitoring-ramaa
**SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

**METADATA**

**Target 4.6**  By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

**4.6.2  Youth/adult literacy rate**

**Definition**
The youth literacy rate is defined by the percentage of the population aged 15 to 24 years that can read and write. It is typically measured according to the ability to comprehend a short simple statement on everyday life. Generally, literacy also encompasses numeracy, and measurement may incorporate a simple assessment of arithmetic ability. The literacy rate and number of literates should be distinguished from functional literacy, a more comprehensive measure of literacy assessed on a continuum in which multiple proficiency levels can be determined.

The adult literacy rate is defined by the percentage of the population aged 15 years and over that can read and write. It is typically measured according to the ability to comprehend a short simple statement on everyday life. Generally, literacy also encompasses numeracy, and measurement may incorporate a simple assessment of arithmetic ability. The literacy rate and number of literates should be distinguished from functional literacy, a more comprehensive measure of literacy assessed on a continuum in which multiple proficiency levels can be determined.

**Purpose**
To show the accumulated achievement of primary education and literacy programmes in imparting basic literacy skills to the population. Literacy represents a potential for further intellectual growth and contribution to economic, social and cultural development of society.

**Calculation method**
Percentage of the number of literate persons out of the total number of persons in the same age group, excluding persons with unknown literacy status.

\[
LR_{AG_i} = \frac{LP_{AG_i}}{P_{AG_i}}
\]
where:

\( L_{RAG_i} \) = literacy rate of population in age group \( i \).

\( LP_{AG_i} \) = literate population in age group \( i \).

\( P_{AG_i} \) = population in age group \( i \), excluding persons with unknown literacy status.

\( i \) = 15 to 24 years old (youth), 15 years and older (adults).

**Interpretation**

A high literacy rate suggests the existence of an effective primary education system and/or literacy programmes that have enabled a large proportion of the population to acquire the ability of using the written word (and making simple arithmetic calculations) in daily life and to continue learning. It is common practice to present and analyse literacy rates together with the absolute number of adult illiterates as improvements in literacy rates may sometimes be accompanied by increases in the illiterate population due to a changing demographic structure.

**Type of data source**

National population census; household and/or labour force surveys.

**Disaggregation**

By sex, urban/rural location, and the following age groups: 15 and above; 25-64; 65 and above. The options for disaggregation may be limited by the sample size in a survey.

**Data required**

Population in the relevant age group by literacy status (literate/illiterate).

**Data sources**

National data on literacy are typically collected through self- or household-declaration in household surveys or population censuses that rely on the ‘able to read and write a simple statement’ definition of literacy, although the questions asked in surveys vary between countries. Household surveys like the Demographic and Health Surveys (DHS, http://dhsprogram.com) and Multiple Indicator Cluster Surveys (MICS, http://mics.unicef.org) have moved from self- or household-declaration to simple assessments in the form of a reading test, in which respondents are asked to read a simple sentence written in their language.

**Quality assurance**

The indicator for each age group should be based on consistent and comprehensive data on literate and illiterate populations according to the national definition. This definition may vary across countries and across surveys within the same country. The UIS maintains the
global database used to produce this indicator. To facilitate data interpretation and use, the UIS defines standards protocols for data and metadata reporting by countries.

**Limitations and comments**
Some countries apply definitions and criteria for literacy which are different from the international standards defined above, or equate persons with no schooling to illiterates, or change definitions between censuses. Some assessments of literacy may also rely on self-reporting, possibly reducing accuracy. In countries where nearly all individuals have completed basic education, the literacy rate provides limited information on the variance of literacy skills in the population.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.6  By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

4.6.3  Participation rate of illiterate youth/adults in literacy programmes

Definition
Number of youth (aged 15-24 years) and adults (aged 15 years and older) participating in literacy programmes expressed as a percentage of the illiterate population of the same age.

Purpose
To show the level of participation of illiterate youth and adults in literacy programmes.

Calculation method
Percentage of the number of illiterate persons in the relevant age group participating in literacy programmes out of the illiterate population of the same age.

\[
PRLP_a^t = \frac{PartLit_a^t}{IllitPop_a^t}
\]

where:

\( PRLP_a^t \) = participation rate of the population of age group \( a \) in literacy programmes in year \( t \).

\( PartLit_a^t \) = participants in literacy programmes of age group \( a \) in year \( t \).

\( IllitPop_a^t \) = illiterate population of age group \( a \) in year \( t \).

\( a \) = 15-24 years (youth) or 15 years and older (adults).

Interpretation
A high rate denotes a high degree of coverage of the illiterate population by the programmes designed to reach that specific group. The theoretical maximum value is 100%.

Increasing trends can be considered as reflecting improved coverage by the literate programmes of their target population.
Type of data source
Administrative data, household surveys, and population censuses.

Disaggregation
By age, sex, location, and income (depending on the data source) and others as available.

Data required
Number of participants in the relevant age group in literacy programmes; illiterate population estimates for the same age groups.

Data sources
Administrative or household data on participation in literacy programmes for the age groups defined, combined with illiterate population estimates for the same age groups.

The Technical Cooperation Group on the Indicators for SDG 4 - Education 2030 (TCG) has recommended a set of survey questions to collect data for SDG indicators 4.3.1, 4.3.3 and 4.6.3 (see http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2019/01/TCG5-REF-4-indicator-4.3.1.pdf).

Quality assurance
The indicator for each age group should be based on consistent and comprehensive data on illiterate populations participating in literacy programmes in the country, whether these programmes are formal or non-formal.

Limitations and comments
Practices for identifying illiterates from administrative sources, household surveys, actual census enumerations or population estimates may vary, hence, the indicator values must be analysed with caution and together with other indicators reflecting the literacy situation of the population.

The theoretical maximum value of 100% is under the assumption that literate population will not enrol or attend literacy programmes.

The degree of coverage of the illiterate population measured by this indicator might be underestimated because of the exclusion of illiterate population, especially youth illiterates, that have decided to attend primary education programmes instead of specifically-designed literacy programmes.

When numerator and denominator are taken from household surveys, special attention should be given to the estimations' standard errors mainly in countries with very high levels of literacy where the sample sizes and design might not be appropriate for producing the
indicator. When numerator and denominator are taken from different data sources (e.g. administrative data, household surveys, or population estimates), there will be possibilities of inconsistencies.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment

Definition

The indicator measures the extent to which countries mainstream Global Citizenship Education (GCED) and Education for Sustainable Development (ESD) in their education systems. This is an indicator of characteristics of different aspects of education systems: education policies, curricula, teacher training and student assessment as reported by government officials, ideally following consultation with other government ministries, national human rights institutes, the education sector and civil society organizations. It measures what governments intend and not what is implemented in practice in schools and classrooms.

For each of the four components of the indicator (policies, curricula, teacher education, and student assessment), a number of criteria are measured, which are then combined to give a single score between zero and one for each component. (See methodology section for full details).

The indicator and its methodology have been reviewed and endorsed by UNESCO’s Technical Cooperation Group on the Indicators for SDG 4-Education 2030 (TCG), which is responsible for the development and maintenance of the thematic indicator framework for the follow-up and review of SDG 4.
Purpose
In order to achieve SDG targets 4.7, it is necessary for governments to ensure that ESD and GCED and their sub-themes are fully integrated in all aspects of their education systems. Students will not achieve the desired learning outcomes if ESD and GCED have not been identified as priorities in education policies or laws, if curricula do not specifically include the themes and sub-themes of ESD and GCED, and if teachers are not trained to teach these topics across the curriculum.

This indicator aims to give a simple assessment of whether the basic infrastructure exists that would allow countries to deliver quality ESD and GCED to learners, to ensure their populations have adequate information on sustainable development and lifestyles in harmony with nature. Appropriate education policies, curricula, teacher education, and student assessment are key aspects of national commitment and effort to implement GCED and ESD effectively and to provide a conducive learning environment.

Each component of the indicator is assessed on a scale of zero to one. The closer to one the value, the better mainstreamed are ESD and GCED in that component. By presenting results separately for each component, governments will be able to identify in which areas more efforts may be needed.

In 1974, UNESCO Member States adopted the Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms, which encapsulates many of the aims of SDG targets 4.7, 12.8 and 13.3. Every four years countries report on the implementation of the Recommendation. This well-established formal mechanism will be the data source for indicator 4.7.1/12.8.1/13.3.1. The seventh quadrennial reporting round is scheduled to take place in 2020.

Calculation method
Information collected with the questionnaire for monitoring the implementation by UNESCO Member States of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms will be used for the construction of the global indicator. For each of the four components of the indicator (policies, curricula, teacher education, and student assessment), a number of criteria are measured, which are then combined to give a single score between zero and one for each component. Only information for primary and secondary education will be used for calculation of indicator 4.7.1/12.8.1/13.3.1.

(a) Laws and policies
The following questions are used to calculate the policies component of the indicator:

A2: Please indicate which GCED and ESD themes are covered in national or sub-national laws, legislation or legal frameworks on education.
There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) and two levels of government (national and sub-national) = 16 responses.

Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank the component score is not calculated.

Note that ‘not applicable’ is used where only one level of government is responsible for education.

Question score = simple mean of the 0 and 1 scores, excluding not applicables (i.e., if eight of the 16 responses are ‘not applicable’, the sum of the 0 and 1 scores is divided by 8 to get the mean and not by 16).

A4. Please indicate which GCED and ESD themes are covered in national or sub-national education policies, frameworks or strategic objectives.

There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.

Response categories are no = 0, yes = 1, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.

If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.

Question score = simple mean of the 0 and 1 scores.

A5. Please indicate whether national or sub-national education policies, frameworks or strategic objectives on education provide a mandate to integrate GCED and ESD.

There are two levels of government (national, sub-national) and five areas of integration (curricula, learning objectives, textbooks, teacher education, and student assessment) = 10 responses.

Response categories are no = 0, yes = 1, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.

If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.

Note that ‘not applicable’ is used where only one level of government is responsible for education.
E1. Based on your responses to questions in the previous section (laws and policies) please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in education laws and policies in your country.

There are two levels of government (national, sub-national) = 2 responses.

Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.

If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.

Note that ‘not applicable’ is used where only one level of government is responsible for education.

Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1 as do the scores for the other three questions in this section.

Policy component score = simple mean of the scores for questions A2, A4, A5 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).

(b) Curricula

The following questions are used to calculate the curricula component of the indicator:

B2: Please indicate which GCED and ESD themes are taught as part of the curriculum.

There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.

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1 GCED and ESD are mainstreamed if they or their themes and sub-themes are mentioned explicitly in relevant documents and are expected to be implemented by the relevant authorities (e.g. Ministries, regional or local education authorities), educational institutions (e.g. schools, colleges and universities), and/or education professionals (e.g. teachers and lecturers), as appropriate.
Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank, the component score is not calculated.

Note that responses to ‘other subjects, please specify’ in the question are ignored. If appropriate, during quality assurance answers in this category may be recoded to one of the other 12 subjects.

Question score = simple mean of the 0 and 1 scores.

**B3. Please indicate in which subjects or fields of study GCED and ESD are taught in primary and secondary education.**

There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) and twelve subjects in which they may be taught (arts; civics, civil or citizenship education; ethics/moral studies; geography; health, physical education and sports; history; languages; mathematics; religious education; science; social studies and integrated studies) = 96 responses.

Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank the question score is not calculated.

Note that responses to ‘other subjects, please specify’ in the question are ignored. If appropriate, during quality assurance answers in this category may be recoded to one of the other 12 subjects.

Question score = simple mean of the 0 and 1 scores.

**B4. Please indicate the approaches used to teach GCED and ESD in primary and secondary education.**

There are four teaching approaches (GCED/ESD as separate subjects, cross-curricular, integrated, whole school) = 4 responses.

Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank the component score is not calculated.

Question score = simple mean of the 0 and 1 scores.
E1. Based on your responses to questions in the previous section (curricula) please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed\(^2\) in curricula in your country.

There are two levels of government (national, sub-national) = 2 responses.

Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.

If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.

Note that ‘not applicable’ is used where only one level of government is responsible for education.

Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1, as do the scores for the other three questions in this section.

Curricula component score = simple mean of the scores for questions B2, B3, B4 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).

(c) Teacher education

The following questions are used to calculate the teacher education component of the indicator:

C2: Please indicate whether teachers, trainers and educators are trained to teach GCED and ESD during initial or pre-service training and/or through continuing professional development.

There are two types of training (initial/pre-service and continuing professional development) and two types of teachers (of selected subjects in which ESD/GCED are typically taught, and of other subjects) = 4 responses.

Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.

\(^2\) GCED and ESD are mainstreamed if they or their themes and sub-themes are mentioned explicitly in relevant documents and are expected to be implemented by the relevant authorities (e.g. Ministries, regional or local education authorities), educational institutions (e.g. schools, colleges and universities), and/or education professionals (e.g. teachers and lecturers), as appropriate.
If more than half of responses are unknown or blank, the component score is not calculated.

Question score = simple mean of the 0 and 1 scores.

C3. Please indicate on which GCED and ESD themes pre-service or in-service training is available for teachers, trainers and educators.

There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.

Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank, the component score is not calculated.

Question score = simple mean of the 0 and 1 scores.

C4. Please indicate whether teachers, trainers and educators are trained to teach the following dimensions of learning in GCED and ESD.

There are four learning dimensions (knowledge, skills, values, and attitudes/behaviours) = 4 responses.

Response categories are no = 0, yes = 1, and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank, the component score is not calculated.

Question score = simple mean of the 0 and 1 scores.

C5. Please indicate whether teachers, trainers and educators are trained to use the following approaches to teach GCED and ESD in primary and secondary education.

There are four teaching approaches (GCED/ESD as separate subjects, cross-curricular, integrated, whole school) = 4 responses.

Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank, the component score is not calculated.

Question score = simple mean of the 0 and 1 scores.
E1. Based on your responses to questions in the previous section (teacher education), please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in teacher education in your country.

There are two levels of government (national, sub-national) = 2 responses.

Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable (which is ignored). Blanks are also treated as zeros.

If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.

Note that ‘not applicable’ is used where only one level of government is responsible for education.

Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1, as do the scores for the other three questions in this section.

Teacher education component score = simple mean of the scores for questions C2, C3, C4, C5 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).

(d) Student assessment

The following questions are used to calculate the student assessment component of the indicator:

D2: Please indicate whether the GCED and ESD themes below are generally included in student assessments or examinations.

There are eight GCED/ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well-being, and sustainable consumption and production) = 8 responses.

Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.

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3 GCED and ESD are mainstreamed if they or their themes and sub-themes are mentioned explicitly in relevant documents and are expected to be implemented by the relevant authorities (e.g. Ministries, regional or local education authorities), educational institutions (e.g. schools, colleges and universities) and/or education professionals (e.g. teachers and lecturers), as appropriate.
If more than half of responses are unknown or blank, the component score is not calculated.

**Question score = simple mean of the 0 and 1 scores.**

**D3. Please indicate which of the dimensions of learning in GCED and ESD below are generally included in student assessments or examinations.**

There are four learning dimensions (knowledge, skills, values, and attitudes/behaviours) = 4 responses.

Response categories are no = 0, yes = 1 and unknown, which is treated as zero. Blanks are also treated as zeros.

If more than half of responses are unknown or blank, the component score is not calculated.

**Question score = simple mean of the 0 and 1 scores.**

**E1. Based on your responses to questions in the previous section (student assessment), please indicate to what extent global citizenship education (GCED) and education for sustainable development (ESD) are mainstreamed in student assessment in your country.**

There are two levels of government (national, sub-national) = 2 responses.

Response categories are not at all = 0, partially = 1, extensively = 2, unknown (treated as zero), and not applicable, which is ignored. Blanks are also treated as zeros.

If more than half of responses excluding not applicables are unknown or blank, the component score is not calculated.

Note that ‘not applicable’ is used where only one level of government is responsible for education.

**Question score = half the simple mean of the 0, 1 and 2 scores, excluding not applicables (i.e., if one of the two responses is ‘not applicable’, the sum of the 0, 1 and 2 scores is divided by 2 to get half the mean and not by 4). The score is half the mean in order to ensure it lies between 0 and 1, as do the scores for the other three questions in this section.**

Student assessment component score = simple mean of the scores for questions D2, D3 and E1 (except where the component score should not be calculated because too many responses were unknown or blank).

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4 GCED and ESD are mainstreamed if they or their themes and sub-themes are mentioned explicitly in relevant documents and are expected to be implemented by the relevant authorities (e.g. Ministries, regional or local education authorities), educational institutions (e.g. schools, colleges and universities) and/or education professionals (e.g. teachers and lecturers) as appropriate.
The component scores all lie between zero and one and are presented as a dashboard of four scores. They are not combined to create a single overall score for the indicator. The higher the score, the more GCED and ESD are mainstreamed in the given component. In this way, users can make a simple assessment in which component area more efforts may be needed.

**Interpretation**

Acknowledging that evidence on how the policy guidance and implementation in policy, curricula, teacher training and student assessment actually work and what impact they may have, progress might be interpreted in relation to the comparative/ipsative priority and emphasis assigned to these areas over time, i.e. if and how existence, frequency, priority and scope of implementation change from one data collection to the next.

**Type of data source**

Responses to the quadrennial reporting by UNESCO Member States on the implementation of the 1974 Recommendation concerning Education for International Understanding, Cooperation and Peace and Education relating to Human Rights and Fundamental Freedoms. The next round of reporting is scheduled to take place in 2020.

**Disaggregation**

None.

**Data required**

Information on the extent to which a given country is mainstreaming global citizenship education and education for sustainable development in their education polices and systems.

**Data sources**

Requests for reports are submitted to Ministers Responsible for Relations with UNESCO who are typically Education Ministers. Reports are usually completed by government officials in Ministries of Education. Countries are requested to consult widely before submitting their reports. To assist with this, requests for reports are also copied to NGOs in official partnership with UNESCO and to OHCHR. Prior to release of the results, national data providers and national statistical offices are invited to review the results and, if appropriate, raise any concerns.

**Quality assurance**

- UNESCO will review country responses for consistency and credibility and, if necessary, queries will be raised with national respondents. To assist with this, from
2020, countries will be asked to provide, in addition to completed questionnaires, supporting evidence of their responses in the form of documents or links (e.g. to education policies, laws, curricula, etc.). These will be made publicly available along with completed questionnaires after results are published. UNESCO will also take into account alternative sources of information, where available. These may include national responses to similar intergovernmental consultation processes, such as the Council of Europe’s consultations on the Charter on Education for Democratic Citizenship and Human Rights Education, the UN Economic Commission for Europe’s consultations on the Strategy for Education for Sustainable Development, or other information on ESD and GCED in countries’ national education systems.

- Any proposed changes to response values in the questionnaire as the result of quality assurance procedures will be communicated to and verified with countries by UNESCO. Final results will be shared with countries before publication (i) by UNESCO with the national data providers and (ii) by the UIS with education statistics and SDG indicator focal points as part of its annual SDG indicator verification exercise.

Limitations and comments

The indicator is based on self-reporting by government officials. However, countries will be asked to provide supporting evidence in the form of documents or links (e.g. education policies or laws, curricula, etc.) to back up their responses. In addition, UNESCO will compare responses with available information from alternative sources and, if appropriate, raise queries with national respondents. At the end of the reporting cycle, country responses and the supporting documents will be made publicly available.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**metadata**

**Target 4.7** By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development

**4.7.2 Percentage of schools that provide life skills-based HIV and sexuality education**

**Definition**
Percentage of schools providing life skills-based HIV and sexuality education within the formal curriculum or as part of extra-curricular activities.

**Purpose**
To assess progress towards implementation of life skills-based HIV and sexuality education in all schools. This indicator tracks the proportion of schools that provide life skills-based HIV and sexuality education within the formal curriculum or as part of extra-curricular activities. This indicator reflects curriculum delivery in support of national HIV prevention programmes.

**Calculation method**
The number of schools at each level of education providing life skills-based HIV and sexuality education is expressed as a percentage of all schools at the given level of education.

\[ PSHIV_n = \frac{SHIV_n}{S_n} \]

where:

- \( PSHIV_n \) = percentage of schools at level \( n \) of education providing life skills-based HIV and sexuality education.
- \( SHIV_n \) = schools at level \( n \) of education providing life skills-based HIV and sexuality education.
- \( S_n \) = total number of schools at level \( n \) of education.
**Interpretation**
A high value indicates that a large number of schools at the given level of education provide life skills-based HIV and sexuality education to students.

**Type of data source**
Administrative data.

**Disaggregation**
By level of education.

**Data required**
Number of schools at each level of education providing life skills-based HIV and sexuality education and total number of schools at the same level.

**Data sources**
Administrative data from schools and other providers of education and training.

**Quality assurance**
The indicator should be calculated based on data from accurate and comprehensive enumeration of educational or training institutions with and without formal curriculum or extra-curriculum which included life skills-based HIV and sexuality education courses or activities, whether these institutions are from public or private sector. The UIS maintains a global database used to produce this indicator.

**Limitations and comments**
While the indicator potentially provides a good measure of coverage, considering which schools have provided life skills-based HIV and sexuality education, at the minimum required levels, due to the range of topics and the set minimum package of topics, this indicator is quite complex to calculate using the method of measurement suitable for school-based surveys. It does not capture how much time is actually spent on each of the topics. If only school head teachers report on this indicator, many may not know which topics are taught if life skills-based HIV and sexuality education is not a standalone and assessed subject.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development

4.7.3 Extent to which the framework on the World Programme on Human Rights Education is implemented nationally (as per the UNGA Resolution 59/113)

Definition

SDG Indicator 4.7.3: The extent to which countries have implemented the World Programme on Human Rights Education and, specifically, the 5-year action plans for each phase of its implementation. The action plan for the period 2015-2019 focuses on: (i) consolidating actions in the previous two stages: human rights education in primary and secondary schools (2005-2009); and human rights education for higher education and human rights training programmes for teachers and educators, civil servants, law enforcement officials and military personnel (2010-2014); and (ii) promoting human rights training for media professionals and journalists. It seeks to measure the quantity and quality of country actions and commitment to mainstreaming human rights education.

Data source

National evaluation reports and other evaluations of the implementation of the action plan for each stage of the World Programme on Human Rights Education submitted periodically to the Office of the High Commissioner for Human Rights (OHCHR).

Source definition

UNESCO Institute for Statistics
Calculation method
The method of reporting this indicator has still to be defined. It will be based on an evaluation of reports submitted by countries describing how they are implementing the World Programme on Human Rights Education.

Data required
Information on the extent to which a given country is implementing the World Programme on Human Rights Education. The exact format of reporting has still to be defined.

Interpretation
To be determined.

Limitations
To be determined.

Purpose
The indicator is a measure of government commitment to ensuring that learners at all levels of education have the opportunity to gain the required knowledge and skills in the area of human rights in order to promote sustainable development.

Types of disaggregation
None.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

**Target 4.7** By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

**4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability**

**Definition**

In this report, we use data from ICCS 2016, and PISA 2018 to estimate the proportion of students who reach the targets set by SDG Thematic Indicator 4.7.4 for each country and region with available data. To do that we build on previous work conducted by UNESCO and partially adopt the definitions and operationalization advanced in recent documents (e.g. Hoskins, 2016; IBE, 2016; Sandoval-Hernández & Miranda, 2018; UIS, 2017; UNESCO, 2012a, 2012b, 2013, 2014, 2015). So, drawing on this body of literature we use the following working definitions of GCED and ESD:

**Global Citizenship Education (GCED)**

Nurtures respect for all, building a sense of belonging to a common humanity and helping learners become responsible and active global citizens. GCED aims to empower learners to assume active roles to face and resolve global challenges and to become proactive contributors to a more peaceful, tolerant, and inclusive and secure world.

**Education for Sustainable Development (ESD)**

Empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability, and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education.
4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

The operationalization of these concepts is based on the work of a research team from the International Bureau of Education (IBE) and the Global Education Monitoring Report (GEMR) team that developed a coding scheme (IBE, 2016) to evaluate 78 national curricula for evidence of GCED and ESD content. The exercise involved several pilots, parallel coding with different coders coding the same documents, and resulted in a scheme with seven categories in the knowledge dimension (see Table 1): Interconnectedness and Global Citizenship; Gender Equality; Peace, Non-violence and Human Security; Human Rights; Health and Well-being; Sustainable Development; and Environmental Science. Each of these categories was further divided into sub-categories and then operationalised using the items of international large-scale assessments (ILSA) instruments. The first six categories are considered for indicator 4.7.4 and the last one for indicator 4.7.5.
4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

Table 1. Global Content Framework for SDG indicators 4.7.4 and 4.7.5

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnectedness and Global Citizenship</td>
<td>Globalization</td>
</tr>
<tr>
<td></td>
<td>Global/international citizen(ship), global culture/identity/community</td>
</tr>
<tr>
<td></td>
<td>Global-local thinking, local-global, think global act local, global</td>
</tr>
<tr>
<td></td>
<td>Multicultural(ism)/intercultural(ism)</td>
</tr>
<tr>
<td></td>
<td>Migration, immigration, mobility, movement of people</td>
</tr>
<tr>
<td></td>
<td>Global Competition/competitiveness/globally competitive/international competitiveness</td>
</tr>
<tr>
<td></td>
<td>Global Inequalities/disparities</td>
</tr>
<tr>
<td>Gender Equality</td>
<td>Gender equality / equality / parity</td>
</tr>
<tr>
<td></td>
<td>Empower(ment) of women/girls (female empowerment, encouraging female participation)</td>
</tr>
<tr>
<td>Peace, Non-violence and Human Security</td>
<td>Peace, peace-building</td>
</tr>
<tr>
<td></td>
<td>Awareness of forms of abuse/harassment/violence (school-based violence/bullying, household-based violence, gender-based violence, child abuse/harassment, sexual abuse/harassment)</td>
</tr>
<tr>
<td>Human Rights</td>
<td>Human rights, rights and responsibilities (children’s rights, cultural rights, indigenous rights, women’s rights, disability rights)</td>
</tr>
<tr>
<td></td>
<td>Freedom (of expression, of speech, of press, of association/organisation), civil liberties</td>
</tr>
<tr>
<td></td>
<td>Social justice</td>
</tr>
<tr>
<td></td>
<td>Democracy/democratic rule, democratic values/principles</td>
</tr>
<tr>
<td>Health and Well-being</td>
<td>Physical health/activity/fitness</td>
</tr>
<tr>
<td></td>
<td>Mental, emotional health, psychological health</td>
</tr>
<tr>
<td></td>
<td>Healthy lifestyle (nutrition, diet, cleanliness, hygiene, sanitation, <em>clean water, being/staying healthy)</em></td>
</tr>
<tr>
<td></td>
<td>Awareness of addictions (smoking, drugs, alcohol)</td>
</tr>
<tr>
<td></td>
<td>Sexual and/or reproductive health</td>
</tr>
<tr>
<td>Sustainable Development</td>
<td>Economic sustainability, sustainable growth, sustainable production/consumption, green economy</td>
</tr>
<tr>
<td></td>
<td>Social sustainability, (social cohesion re sustainability)</td>
</tr>
<tr>
<td></td>
<td>Environmental sustainability/environmentally sustainable</td>
</tr>
<tr>
<td></td>
<td>Climate change (global warming, carbon emissions/footprint)</td>
</tr>
<tr>
<td></td>
<td>Renewable energy, alternative energy (sources) (solar, tidal, wind, wave, geothermal, biomass…)</td>
</tr>
<tr>
<td></td>
<td>Ecology, ecological sustainability (ecosystems, biodiversity, biosphere, ecology, loss of diversity)</td>
</tr>
<tr>
<td></td>
<td>Waste management, recycling</td>
</tr>
<tr>
<td>Education for Sustainable Development (ESD)</td>
<td>Physical systems</td>
</tr>
<tr>
<td></td>
<td>Living systems</td>
</tr>
<tr>
<td></td>
<td>Earth and space systems</td>
</tr>
<tr>
<td>Environmental Science (geoscience)</td>
<td>Physical systems</td>
</tr>
</tbody>
</table>

Furthermore, drawing on a review of recent work in the area of global citizenship education, we incorporated the three core dimensions proposed by UNESCO to measure learning outcomes in GCED in this mapping exercise (UNESCO, 2015). These dimensions are interrelated and are presented in Table 2, each indicating the domain of learning they focus on (see Sandoval-Hernández et al., 2019 for further details).
4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

Table 2. Core conceptual dimensions of global citizenship education

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>To acquire knowledge, understanding critical thinking necessary to encompassing the range of cognitive processes involved in learning environmental science concepts, and then applying these concepts and reasoning with them.</td>
</tr>
<tr>
<td>Socio-emotional</td>
<td>To have intrinsic motivation to learn environmental science.</td>
</tr>
<tr>
<td>Behavioural</td>
<td>To have self-confidence or self-concept in their ability to learn environmental science.</td>
</tr>
</tbody>
</table>

The final selection of items was then used to produce a score for each subcategory and to estimate the proportion of the students who reached each of the standards evaluated. Finally, these proportions were combined in a global indicator indicating the proportion of students who reached any of the standards evaluated.

In what follows, we describe our analytical strategy, and, in order to aid the interpretation of the indicators, we present the definition of the cut off points used to consider students to have reached the standards evaluated.

The indicator and its methodology have been reviewed and endorsed by UNESCO's Technical Cooperation Group on the Indicators for SDG 4-Education 2030 (TCG), which is responsible for the development and maintenance of the thematic indicator framework for the follow-up and review of SDG 4. The TCG is composed of 38 regionally representative experts from UNESCO Member States (nominated by the respective geographic groups of UNESCO), as well as international partners, civil society, and the Co-Chair of the Education 2030 Steering Committee. The UNESCO Institute for Statistics acts as the Secretariat.

Calculation method

The analytical strategy includes five main steps: verify the availability of observed responses to the items proposed by the mapping exercise described above, test the unidimensionality of the intended constructs, fit the corresponding measurement models to obtain scores for each standard, estimate the cut-off points to identify the students who reach each of the standards evaluated.

Once the final set of items to be included in each scale was identified based on the availability of responses and the analysis of unidimensionality, we used a latent variable model approach to obtain the corresponding scores. More specifically, we use a partial credit model (Masters & Wright, 1997). Formally, this model can be described by Equation 1 (see Wu et al., 2016):

\[
Pr(Y_{ip} = j | \theta_p) = \frac{\exp \sum_{k=0}^{j} (\theta_p - \delta_{ik})}{\sum_{h=0}^{m_i} \exp \sum_{k=0}^{h} (\theta_p - \delta_{ik})}
\]

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4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

In this model, the probability of answering an item \((Y_{ip})\), with a category of response 0, 1, 2, ..., \(m_i\) by a person \(p\), depends on the propensity of the response of the person \(p\) (\(\theta_p\)). For the first category of response, there is a constraint: \(\sum_{k=0}^{i} (\theta_p - \delta_{ik}) = 1\). Thus, for the first category of response, the numerator in equation 1 is 1. The item parameters \(\delta_{ik}\) needed are one less the number of response categories for each item. Therefore, if all items are dichotomous a single \(\delta\) parameter is estimated per item. However, if all items present 4 categories of responses, then three \(\delta\) parameters are estimated for each item.

Then, using the cut-off points established for each scale, we estimated the proportion of students reaching the standards within each country or region as a simple proportion (see Equation 2).

\[
P = \frac{X}{n}
\]

(2)

Where \(X\) is the number of students that reach a standard in each country and \(n\) is the total number of students in the same country.

We also estimated the proportion of students who meet any of the standards stipulated by indicator 4.7.4, for each country and region for which data is available. To this end, we estimated a mean score that summarizes all the standards that a student has met. This mean score varies from 0 to 1, where the maximum is achievable by a student if and only if this student has met all the standards where he or she was classified. Zero was assigned if a student did not meet any of the proposed standards. Likewise, if a student satisfied two out of three standards, then he or she was attributed a score of .66 (2/3). This calculation is expressed in Equation 3.

\[
\bar{D}_i = \frac{\sum_{i}^{n_D} D_i}{n_D}
\]

(3)

In this equation, \(D_i\) represents a binary variable that classifies if a student \(i\) met a standard. This variable uses a 1 if the student \(i\) meet the standard, and a value of zero if it doesn't. \(n_D\) represent the number of standards. Because \(D_i\) is a binary variable, this mean score can be interpreted as the proportion of standards a student has met.

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4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

**Data source**
The data was sourced from the latest cycles of two major International Large-Scale Assessments: the 2016 IEA International Civic and Citizenship Study (ICCS) and the 2018 OECD Programme for International Student Assessment (PISA). Due to availability and comparability issues, PISA was only used for the Health and well-being scale (See Sandoval-Hernández et al., 2019 for more details).

ICCS is an ongoing, comparative research programme that investigates the ways in which young people are prepared to undertake their roles as citizens. ICCS reports on levels of students’ civic knowledge, their understanding of concepts and issues related to civics and citizenship, as well as their civic attitudes and engagement. In addition, ICCS collects and reports on a rich array of contextual data from policymakers, teachers, school principals, and the students themselves, about the organization and content of civic and citizenship education in the curriculum, teacher qualifications and experiences, school climate, home and community support. In 2016 ICCS collected data from approximately 95,000 (8th grade) students and 50,000 teachers from 3,600 schools in 24 countries.

PISA is an international assessment that measures 15-year-old students' reading, mathematics, and science literacy every three years. In every cycle, PISA also includes rotating measures of general or cross-curricular competencies, such as collaborative problem solving in 2015, financial literacy in 2018, creative thinking in 2022 etc. In PISA, students answer a background questionnaire providing information about themselves, their learning environment, their home and their attitudes to learning. In addition, principals and teachers included in the PISA sample complete questionnaires about their schools. By design, PISA emphasizes functional skills that students have acquired as they near the end of compulsory schooling. Around 600,000 students in 79 economies took part in the PISA 2018.

**Definition of cut-off points (standards)**

**Cognitive**
At the threshold, students make connections between the processes of social and political organization and influence, and the legal and institutional mechanisms used to control them in relation with global citizenship and sustainability. They generate accurate hypotheses on the benefits, motivations, and likely outcomes of institutional policies and citizens’ actions. They integrate, justify, and evaluate given positions, policies or laws based on the principles that underpin them. Students demonstrate familiarity with broad international economic forces and the strategic nature of active participation.

**Non-cognitive**

**Interconnectedness and Global Citizenship**
This category is measured through two sub-categories: ‘Global-local thinking’ and ‘Multicultural(ism)/intercultural(ism)’.

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**Global-local thinking**
At the threshold, students have more than 50% chances to express positive attitudes towards their country of residence. Most of the students at or above the cut-off score agree a lot to expressions such as “I am proud to live in <country of test>”, “In <country of test> we should be proud of what we have achieved”, or “I have great respect for <country of test>.”

**Multicultural(ism)/intercultural(ism)**
At the threshold, students have more than 50% chances to express positive attitudes towards ethnic/racial minorities. Most of the students at or above the cut-off score agree a lot to expressions such as “<Members of all ethnic/racial groups> should be encouraged to run in elections for political office”, “<Members of all ethnic/racial groups> should have equal access to education”, or “<Members of all ethnic/racial groups> should have equal chances to get a good job in <country of test>.”

**Gender Equality**
At the threshold, students have more than 50% chances to strongly endorse gender equality. Most of the students at or above the cut-off score agree a lot to expressions such as “Men and women should have equal opportunities to take part in government” or “Men and women should get equal pay when they are doing the same jobs”. Complementary, most of the students at or above the cut-off score express strong disagreement to expressions such as “Women should stay out of politics” or “Men are better qualified to be political leaders than women”.

**Peace, Non-violence and Human Security**
At the threshold, students have more than 50% chances of reporting not experiencing bullying. Most of the students at or above the cut-off score report not having experienced at all situations such as “being called by an offensive nickname”, “being threatened to be hurt”, or “other students posting offensive pictures or texts about them”.

**Human Rights**
This category is measured through two sub-categories: ‘Freedom (of expression, of speech, of press, of association/organisation)’ and ‘Social Justice’.

**Freedom (of expression, of speech, of press, of association/organisation)**
At the threshold, students have more than 50% chances of identifying situations that are deemed good for democracy, as well as those situations that are deemed bad for democracy. Most of the students at or above the cut-off score consider that situations like “People are allowed to publicly criticize the government” or “All adult citizens have the right to elect their political leaders” are good for democracy. Complementary, most of the students at or above the cut-off score consider that situations like “Political leaders give...”
4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

government jobs to their family members” or “One company or the government owns all newspapers in the country” are bad for democracy.

**Social Justice**
At the threshold, students have more than 50% chances to highly endorse the **importance of social participation in social movements**. Most of the students at or above the cut-off score consider that behaviours such as “Participating in protests against laws believed to be unjust”, “Participating in activities to benefit people in the local community” or “Taking part in activities to protect the environment” are very important for being a good citizen.

**Health and well-being**
At the threshold, students have more than 50% chances to participate in **those activities that promote their psychological, cognitive, social and physical functioning and capabilities that they need to live a happy and fulfilling life**. These students are more likely to sleep well, attend to physical education classes at least, once week, at least two days of moderate physical activity, and more than one day of vigorous physical activity. Likewise, these students are less likely to feel depreessed and less likely to feel anxious.

**Sustainable Development**
At the threshold, students have more than 50% chances of identifying threats to the world’s future and reporting that they would definitely make personal efforts to avoid them. Most of the students at or above the cut-off score consider that, to a large extent, issues like “Pollution”, “global financial crisis”, “Violent conflicts” or “climate change” are a threat to the world’s future; and that they would certainly make personal efforts to help the environment.

**Disaggregation**
Each of the standards described above are published disaggregated by student sex, school location, socio-economic status, and parental level of education. Information on the disaggregation for Indicator 4.7.4 is presented in the following table.
### 4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

#### Table 3. Data disaggregation

<table>
<thead>
<tr>
<th>STUDY</th>
<th>DEFINITION</th>
<th>METRICS</th>
<th>ITEM AND DESCRIPTION</th>
<th>CATEGORIES</th>
<th>INSTRUMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PISA 2018</td>
<td>Sex of students</td>
<td>Nominal</td>
<td>Are you female or male?</td>
<td>Female, Male</td>
<td>Student questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td>ICCS 2016</td>
<td>Sex of students</td>
<td>Nominal</td>
<td>Are you a girl or a boy?</td>
<td>Girl, Boy</td>
<td>Student questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>School location</td>
<td>Ordinal</td>
<td>Which of the following definitions best describes the community in which your school is located? * Response categories were collapsed into 'urban' (more than 100000 people) and 'non-urban' (the rest)</td>
<td>- A village, hamlet or rural area (fewer than 3000 people) - A small town (3000 to about 15000 people) - A town (15000 to about 100000 people) - A city (100000 to about 1000000 people) - A large city (with over 1000000 people)</td>
<td>School questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td>ICCS 2016</td>
<td>School location</td>
<td>Ordinal</td>
<td>Which best describes the immediate area in which this school is located? * Response categories were collapsed into 'urban' (more than 100000 people) and 'non-urban' (the rest)</td>
<td>- A village, hamlet or rural area (fewer than 3000 people) - A small town (3000 to about 15000 people) - A town (15000 to about 100000 people) - A city (100000 to about 1000000 people) - A large city (with over 1000000 people)</td>
<td>School questionnaire (<a href="#">link</a>)</td>
</tr>
</tbody>
</table>

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### 4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

<table>
<thead>
<tr>
<th>Study</th>
<th>Definition</th>
<th>Metrics</th>
<th>Item and Description</th>
<th>Categories</th>
<th>Instrument</th>
</tr>
</thead>
</table>
| PISA 2018  | Socio-economic status | Scale    | Index of Economic, Social and Cultural Status (ESCS), which is derived from several variables related to students' family background: parents' education, parents' occupations, a number of home possessions that can be taken as proxies for material wealth, and the number of books and other educational resources available in the home.  
* This index was re-coded into two categories corresponding to above and below the mean ESCS within each country. | Student questionnaire [link](#)  
Details on the construction of the index can be found in the PISA 2018 Technical Report [link](#) |                                                                                                                                   |
| ICCS 21016 | Socio-economic status | Scale    | National index of students' socioeconomic background (NISB), which is derived from the following indices: highest occupational status of parents, highest educational level of parents, and the number of books at home.  
* This index was re-coded into two categories corresponding to above and below the mean NISB within each country. | Student questionnaire [link](#)  
Details on the construction of the index are in the ICCS 2016 Technical Report [link](#) |                                                                                                                                   |
| PISA 2018  | Parental education    | Ordinal  | What is the <highest level of schooling> completed by your mother/father?  
* Response categories were collapsed into 'higher education' (ISCED 5A and above) and 'non-higher education' (the rest) | - None,  
- ISCED 1 (primary education)  
- ISCED 2 (lower secondary)  
- ISCED Level 3B or 3C (vocational/pre-vocational upper secondary)  
- ISCED 3A (general upper secondary) and/or ISCED 4 (nontechnical post-secondary)  
- ISCED 5B (vocational tertiary)  
- ISCED 5A and ISCED 6 (theoretically oriented) | Student questionnaire [link](#)  
Details on the combination of the responses for father and mother education can be found in the PISA 2018 Technical Report [link](#) |
### 4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

<table>
<thead>
<tr>
<th>Study</th>
<th>Definition</th>
<th>Metrics</th>
<th>Item and Description</th>
<th>Categories</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICCS 2018</td>
<td>Parental education</td>
<td>Ordinal</td>
<td>What is the highest level of education completed by your mother/father or &lt;female/male guardian&gt;? * Response categories were collapsed into ‘higher education’ (Completion of ISCED level 6 and above) and ‘non-higher education’ (the rest)</td>
<td>tertiary and post-graduate)</td>
<td>Student questionnaire (<a href="#">link</a>)&lt;br&gt;Details on the combination of the responses for father and mother education can be found in the ICCS 2016 Technical Report (<a href="#">link</a>)</td>
</tr>
</tbody>
</table>
4.7.4 Percentage of students in lower secondary education showing adequate understanding of issues relating to global citizenship and sustainability

Limitations
In very simple terms, cut-off scores refer to a point in a scale used to classify individuals, according to the level of the attribute under study, between those above and below a threshold. As such, this threshold should represent a meaningful interpretation of the level of the attribute under study, in this case ‘understanding issues related to global citizenship and sustainability’. In other words, students scoring above the threshold should be able to demonstrate “adequate understanding of issues relating to global citizenship and sustainability”. In this report, we have used a well-established statistical method (wright-maps) to determine the thresholds for the scales we constructed, and we have provided a description of what these thresholds mean according to the ICCS and PISA frameworks (e.g. how much students know and understand, what their perceptions about different issues are and how are they willing to act on them). Nevertheless, the exact position of the thresholds in the different scales could be open for discussion among stakeholders.

ILSA data are uniquely suited to contribute to measuring SDGs because their methods ensure that comparable student, school and system information is collected across all participating countries. This is a significant advantage compared to the alternative of compiling and harmonizing national datasets or developing a purpose-built study. However, it is important to keep in mind that neither ICCS nor PISA were designed to measure SDG 7.4.4. For this reason, the information used here has limitations related to availability (e.g. the country coverage), sufficiency (e.g. there are not items to cover all the dimensions and subcategories established in the global content framework), and relevance (e.g. the scales produced here can only be considered as proxy measures of the concepts established in SDG 4.7.4).

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References
UNESCO. (2012a). Education for Sustainable Development Sourcebook. UNESCO.
UNESCO. (2013). Global Citizenship Education: An Emerging Perspective, Outcome document of the Technical Consultation on Global Citizenship Education. UNESCO.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**Target 4.7** By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

**4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience**

**Definition**

Data from TIMSS 2019 was used to estimate the proportion of students who reach the targets set by SDG indicator 4.7.5 for each country and region with available data. To do that we build on previous work conducted by UNESCO and partially adopt the definitions and operationalization advanced in recent documents (e.g. Hoskins, 2016; IBE, 2016; Sandoval-Hernández & Miranda, 2018; UIS, 2017; UNESCO, 2012a, 2012b, 2013, 2014, 2015). So, drawing on this body of literature we use the following working definitions of GCED and ESD:

*Global Citizenship Education (GCED)*

Nurtures respect for all, building a sense of belonging to a common humanity and helping learners become responsible and active global citizens. GCED aims to empower learners to assume active roles to face and resolve global challenges and to become proactive contributors to a more peaceful, tolerant, and inclusive and secure world.

*Education for Sustainable Development (ESD)*

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1 Please note that these definitions and operationalisations refer to a Global Content Framework that contains both SDG 4.7.4 and 4.7.5. So, not all concepts are related to environmental science and geoscience. Nevertheless, information on the whole framework is included for the reader to have a full perspective of it. See Sandoval-Hernandez, et al. (2019) for a detailed description of this Global Content Framework and the methodology used to establish it.
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

Empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education.

The operationalization of these concepts is based on the work of a research team from the International Bureau of Education (IBE) and the Global Education Monitoring Report (GEMR) team that developed a coding scheme (IBE, 2016) to evaluate 78 national curricula for evidence of GCED and ESD content. The exercise involved several pilots, parallel coding with different coders coding the same documents, and resulted in a scheme with seven categories in the knowledge dimension (see Table 1): Interconnectedness and Global Citizenship; Gender Equality; Peace, Non-violence and Human Security; Human Rights; Health and Well-being; Sustainable Development; and Environmental Science. Each of these categories was further divided into sub-categories and then operationalised using the items of ILSA instruments. The first six categories are considered for indicator 4.7.4 and the last one for indicator 4.7.5.
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

Table 1. Global Content Framework for SDG indicators 4.7.4 and 4.7.5

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnectedness and Global Citizenship</td>
<td>Globalization</td>
</tr>
<tr>
<td></td>
<td>Global/international citizenship, global culture/identity/community</td>
</tr>
<tr>
<td></td>
<td>Global-local thinking, local-global, think global act local, local</td>
</tr>
<tr>
<td></td>
<td>Multicultural(ism)/intercultural(ism)</td>
</tr>
<tr>
<td></td>
<td>Migration, immigration, mobility, movement of people</td>
</tr>
<tr>
<td></td>
<td>Global Competition/competitiveness/globally competitive/international competitiveness</td>
</tr>
<tr>
<td></td>
<td>Global Inequalities/disparities</td>
</tr>
<tr>
<td>Gender Equality</td>
<td>Gender equality / equality / parity</td>
</tr>
<tr>
<td></td>
<td>Empower(ment of) women/girls (female empowerment, encouraging female participation)</td>
</tr>
<tr>
<td>Peace, Non-violence and Human Security</td>
<td>Peace, peace-building</td>
</tr>
<tr>
<td></td>
<td>Awareness of forms of abuse/harassment/violence (school-based violence/bullying, household-based violence, gender-based violence, child abuse/harassment, sexual abuse/harassment)</td>
</tr>
<tr>
<td>Human Rights</td>
<td>Human rights, rights and responsibilities (children’s rights, cultural rights, indigenous rights, women’s rights, disability rights)</td>
</tr>
<tr>
<td></td>
<td>Freedom (of expression, of speech, of press, of association/organisation), civil liberties</td>
</tr>
<tr>
<td></td>
<td>Social justice</td>
</tr>
<tr>
<td></td>
<td>Democracy/democratic rule, democratic values/principles</td>
</tr>
<tr>
<td>Health and Well-being</td>
<td>Physical health/activity/fitness</td>
</tr>
<tr>
<td></td>
<td>Mental, emotional health, psychological health</td>
</tr>
<tr>
<td></td>
<td>Healthy lifestyle (nutrition, diet, cleanliness, hygiene, sanitation, *clean water, being/staying healthy)</td>
</tr>
<tr>
<td></td>
<td>Awareness of addictions (smoking, drugs, alcohol)</td>
</tr>
<tr>
<td></td>
<td>Sexual and/or reproductive health</td>
</tr>
<tr>
<td>Sustainable Development</td>
<td>Economic sustainability, sustainable growth, sustainable production/consumption, green economy</td>
</tr>
<tr>
<td></td>
<td>Social sustainability, (social cohesion re sustainability)</td>
</tr>
<tr>
<td></td>
<td>Environmental sustainability/environmentally sustainable</td>
</tr>
<tr>
<td></td>
<td>Climate change (global warming, carbon emissions/footprint)</td>
</tr>
<tr>
<td></td>
<td>Renewable energy, alternative energy (sources) (solar, tidal, wind, wave, geothermal, biomass…)</td>
</tr>
<tr>
<td></td>
<td>Ecology, ecological sustainability (ecosystems, biodiversity, biosphere, ecology, loss of diversity)</td>
</tr>
<tr>
<td></td>
<td>Waste management, recycling</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>Physical systems</td>
</tr>
<tr>
<td>(geoscience)</td>
<td>Living systems</td>
</tr>
<tr>
<td></td>
<td>Earth and space systems</td>
</tr>
</tbody>
</table>

Furthermore, drawing on a review of recent literature, we incorporated the three core dimensions proposed by UNESCO to measure learning outcomes in GCED/ESD in this mapping exercise (UNESCO, 2015). These dimensions are interrelated and are presented in Table 2, each indicating the domain of learning they focus on (see Sandoval-Hernández et al., 2019 for further details).
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

Table 2. Core conceptual dimensions of environmental education

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>To acquire knowledge, understanding critical thinking necessary to encompassing the range of cognitive processes involved in learning environmental science concepts, and then applying these concepts and reasoning with them.</td>
</tr>
<tr>
<td>Socio-emotional</td>
<td>To have intrinsic motivation to learn environmental science.</td>
</tr>
<tr>
<td>Behavioural</td>
<td>To have self-confidence or self-concept in their ability to learn environmental science.</td>
</tr>
</tbody>
</table>

The final selection of items was then used to produce a score for each subcategory and to estimate the proportion of the students who reached each of the standards evaluated. Finally, these proportions were combined in a global indicator indicating the proportion of students who reached any of the standards evaluated.

In what follows, the analytical strategy is described, and, in order to aid the interpretation of the indicators, the definition of the cut off points used to consider students to have reached the standards evaluated is presented.

The indicator and its methodology have been reviewed and endorsed by UNESCO’s Technical Cooperation Group on the Indicators for SDG 4-Education 2030 (TCG), which is responsible for the development and maintenance of the thematic indicator framework for the follow-up and review of SDG 4. The TCG is composed of 38 regionally representative experts from UNESCO Member States (nominated by the respective geographic groups of UNESCO), as well as international partners, civil society, and the Co-Chair of the Education 2030 Steering Committee. The UNESCO Institute for Statistics acts as the Secretariat.

Analytical strategy
The analytical strategy includes five main steps:
1. verify the availability of observed responses to the items proposed by the mapping exercise described above;
2. test the unidimensionality of the intended constructs;
3. fit the corresponding measurement models to obtain scores for each standard;
4. estimate the cut-off points to identify the students who reach each of the standards evaluated, and
5. once the final set of items to be included in each scale was identified based on the availability of responses and the analysis of unidimensionality, a latent variable model approach to obtain the corresponding scores was used. More specifically, a partial credit model was used (Masters & Wright, 1997). Formally, this model can be described by Equation 1 (see Wu et al., 2016):
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

\[
P_r(Y_{ip} = j | \theta_p) = \frac{\exp \sum_{k=0}^{j} (\theta_p - \delta_{ik})}{\sum_{h=0}^{m_i} \exp \sum_{k=0}^{h} (\theta_p - \delta_{ik})}
\]  

In this model, the probability of answering an item \((Y_{ip})\), with a category of response 0, 1, 2, ..., \(m_i\) by a person \(p\), depends on the propensity of the response of the person \(p\) \((\theta_p)\). For the first category of response, there is a constraint: \(\sum_{k=0}^{0} (\theta_p - \delta_{ik}) = 1\). Thus, for the first category of response, the numerator in Equation 1 is 1. The item parameters \(\delta_{ik}\) needed are one less the number of response categories for each item. Therefore, if all items are dichotomous a single \(\delta\) parameter is estimated per item. However, if all items present 4 categories of responses, then three \(\delta\) parameters are estimated for each item. Then, using the cut-off points established for each scale, we estimated the proportion of students reaching the standards within each country or region as a simple proportion (see Equation 2).

\[
P = \frac{X}{n}
\]  

Where \(X\) is the number of students that reach a standard in each country and \(n\) is the total number of students in the same country.

We also estimated the proportion of students who meet any of the standards stipulated by indicator 4.7.5, for each country and region for which data is available. To this end, we estimated a mean score that summarizes all the standards that a student has met. This mean score varies from 0 to 1, where the maximum is achievable by a student if and only if this student has met all the standards where he or she was classified. Zero was assigned if a student did not meet any of the proposed standards. Likewise, if a student satisfied two out of three standards, then he or she was attributed a score of .66 (2/3). This calculation is expressed in Equation 3.

\[
\bar{D}_i = \frac{\sum_{i=1}^{n_p} D_{li}}{n_p}
\]  

In this equation, \(D_{li}\) represents a binary variable that classifies if a student \(i\) met a standard. This variable uses a 1 if the student \(i\) meet the standard, and a value of zero if it doesn’t. \(n_p\) represent the number of standards. Because \(D_{li}\) is a binary variable, this mean score can be interpreted as the proportion of standards a student has met.
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

Data Sources
The data was sourced from the latest cycles of the IEA Trends in International Mathematics and Science Study (TIMSS). TIMSS is an international assessment of mathematics and science at the fourth and eighth grades that has been conducted every four years since 1995. TIMSS 2019 is the seventh assessment in the TIMSS series monitoring 20 years of trends in educational achievement, together with comprehensive data on students' contexts for learning mathematics and science. In 2019, 64 countries and 8 benchmarking entities (regional jurisdictions of countries such as states or provinces) participated in TIMSS. In total, more than 580,000 students participated in TIMSS 2019.

Description of cut-off points (standards)

Cognitive
At the threshold, students apply and communicate their understanding of concepts from environmental science and geoscience in everyday and abstract situations. They communicate their understanding of ecosystems and the interaction of organisms with their environment and apply some knowledge of human health related to nutrition and infectious disease. Students show some knowledge and understanding of the composition and properties of matter and chemical change. They apply knowledge of Earth's physical features, processes, cycles, and history, and show some understanding of Earth's resources, their use, and conservation as well as some knowledge of the interaction between the Earth and the Moon.

Non-cognitive

Enjoy environmental science and geoscience
At the threshold, students have more than 50% chances to express high enjoyment of learning environmental science and geoscience. Most of the students at or above the cut-off score agree a lot to expressions such as “I like to conduct science experiments”, “I learn many interesting things in science” or “I like Science”. Complementary, most of the students at or above the cut-off score express disagreement to expressions such as “Science is boring” or “I wish I did not have to study science.”

Confidence in environmental science and geoscience
At the threshold, students have more than 50% chances to report high confidence in learning environmental science and geoscience. Most of the students at or above the cut-off score highly disagree with the statement “Science makes me confused”, and express agreement to statements such as “I learn things quickly in science”, “I usually do well in science”, or “I'm good to work out difficult science problems.”

Limitations
In very simple terms, cut-off scores refer to a point in a scale used to classify individuals, according to the level of the attribute under study, between those above and below a threshold. As such, this threshold should represent a meaningful interpretation of the level
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

of the attribute under study, in this case ‘knowledge of environmental science and geoscience’. In other words, students scoring above the threshold should be able to demonstrate ‘proficiency in knowledge of environmental science and geoscience’. In this report, we have used a well-established statistical method (wright-maps) to determine the thresholds for the scales we constructed, and we have provided a description of what these thresholds mean according to the TIMSS framework (e.g. how much students know and understand, what their perceptions about different issues are and how are they willing to act on them). Nevertheless, the exact position of the thresholds in the different scales could be open for discussion among stakeholders.

International large(ILSA) data are uniquely suited to contribute to measuring SDGs because their methods ensure that comparable student, school and system information is collected across all participating countries. This is a significant advantage compared to the alternative of compiling and harmonizing national datasets or developing a purpose-built study. However, it is important to keep in mind that TIMSS was not designed to measure SDG 4.7.5. For this reason, the information used here has limitations related to availability (e.g. the country coverage), sufficiency (e.g. there not items to cover all the dimensions established in the global content framework), and relevance (e.g. the scales produced here can only be considered as proxy measures of the concepts established in SDG 4.7.5).

Data Disaggregation
Each of the standards described above are published disaggregated by student sex, school location, socio-economic status and parental level of education. Information on the disaggregation for Indicator 4.7.5 is presented in the following table.

Updated February 2021
### 4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

#### Table 3. Data disaggregation

<table>
<thead>
<tr>
<th>Study</th>
<th>Definition</th>
<th>Metrics</th>
<th>Item and description</th>
<th>Categories</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIMSS 2019</td>
<td>Sex of students</td>
<td>Nominal</td>
<td>Are you a girl or a boy?</td>
<td>Girl, Boy</td>
<td>Student questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td>TIMSS 2019</td>
<td>School location</td>
<td>Ordinal</td>
<td>How many people live in the city, town, or area where your school is located? *</td>
<td>- More than 500,000 people</td>
<td>School questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td>TIMSS 2019</td>
<td>Socio-economic status</td>
<td>Scale</td>
<td>Home Educational Resources Scale (HER), which is derived based on students’ responses concerning the availability of three resources: number of books in the home, number of home study supports, and highest level of education of either parent. * This index was re-coded into two categories corresponding to above and below the mean HER within each country.</td>
<td>- 50,001 to 100,000 people</td>
<td>Student questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td>TIMSS 2019</td>
<td>Parental education</td>
<td>Ordinal</td>
<td>What is the highest level of education completed by your mother/father or &lt;female/male guardian&gt;? *</td>
<td>- Some &lt;Primary education-ISCED Level 1 or Lower secondary education-ISCED Level 2&gt; or did not go to school</td>
<td>Student questionnaire (<a href="#">link</a>)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Lower secondary education-ISCED Level 2&gt;</td>
<td>- &lt;Upper secondary education-ISCED Level 3&gt;</td>
<td>Details on the combination of the responses for father and mother education can be found in the TIMSS 2019 Technical Report (<a href="#">link</a>)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- &lt;Post-secondary, non-tertiary education-ISCED Level 4&gt;</td>
<td>- &lt;Short-cycle tertiary education-ISCED Level 5&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- &lt;Bachelor’s or equivalent level-ISCED Level 6&gt;</td>
<td>- &lt;Postgraduate degree: Master’s-ISCED Level 7 or Doctor-ISCED Level 8&gt;</td>
<td></td>
</tr>
</tbody>
</table>
4.7.5 Percentage students in lower secondary education showing proficiency in knowledge of environmental science and geoscience

References


UNESCO. (2012a). Education for Sustainable Development Sourcebook. UNESCO.


UNESCO. (2013). Global Citizenship Education: An Emerging Perspective, Outcome document of the Technical Consultation on Global Citizenship Education. UNESCO.


SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**Metadata**

**Target 4.7** By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

**4.7.6** Extent to which (i) global citizenship education (GCED) and (ii) education for sustainable development (ESD), including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment

**Definition**
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.a.1 Proportion of schools offering basic services, by type of service

Definition
Percent of schools by level of education with each specified infrastructure or service.

Data sources
Two sets of data sources are used: national administrative data reported to the UIS through the UIS country questionnaire and cross-national learning assessment programme data.

Data source 1: Administrative data
Data collection: The UNESCO Institute for Statistics produces time series based on data reported by Ministries of Education or National Statistical Offices. The data are gathered through the annual Survey of Formal Education (on access to electricity, drinking water, sanitation and hand-washing facilities) and through the Survey on ICTs in Education (on access to electricity, Internet and computers). Data on adapted infrastructure are not collected currently. Countries are asked to report data according to the levels of education defined in the International Standard Classification of Education (ISCED) to ensure international comparability of resulting indicators.

The data received are validated using electronic error detection systems that check for arithmetic errors and inconsistencies and trend analysis for implausible results. Queries are taken up with the country representatives reporting the data so that corrections can be made (of errors) or explanations given (of implausible but correct results). During this process countries are also encouraged to provide estimates for missing or incomplete data items.

In addition, countries also have an opportunity to see and comment on the main indicators the UIS produces in an annual “country review” of indicators.
4.a.1 Proportion of schools offering basic services, by type of service

**Calculation method:** The number of schools in a given level of education with access to the relevant facilities is expressed as a percentage of all schools at that level of education.

\[ PS_{n,f} = \frac{S_{n,f}}{S_n} \]

where:

- \( PS_{n,f} \) = percentage of schools at level \( n \) of education with access to facility \( f \)
- \( S_{n,f} \) = schools at level \( n \) of education with access to facility \( f \)
- \( S_n \) = total number of schools at level \( n \) of education

**Disaggregation:** By level of education.

**Treatment of missing values**
At country level: The UIS estimates certain key items of data that may be missing or incomplete in order to have publishable estimates at the country level. Where this is not possible the UIS imputes missing values for use only for calculating regional and global aggregates.

In all cases estimates are based on evidence from the country itself (e.g., information from the data provider on the size of the missing component, via correspondence, publications or data on the Ministry's or National Statistical Office's Webpage, or via surveys conducted by other organizations) or on data from the country for a previous year.

Where data are available for a country for both an earlier and a more recent year than the missing year, a simple linear interpolation is made. Where data are only available for an earlier year, the most recent value is used as an estimate. Similarly, where data are only available for a more recent year, the last value is used as an estimate.

Where the relevant data are not available at all for a country, estimates may be based on another variable which is clearly linked to the item being estimated. For example, schools with access to basic services or facilities may be estimated from the total number of schools.

Where no data are available for the country in any year that can inform the estimate, the unweighted average for the region in which the country lies is used.
4.a.1 Proportion of schools offering basic services, by type of service

Currently no estimates are made for this indicator for the purpose of having publishable country-level data.

At regional and global levels: Regional and global aggregates are derived from both publishable and imputed national data. Publishable data are the data submitted to the UIS by Member States or the result of an explicit estimation made by the Institute based on pre-determined standards. In both cases, these data are sent to Member States for review before they are considered publishable by the UIS.

When data are not available for all countries, the UIS imputes national data for the sole purpose of calculating regional averages. These imputed data are not published nor otherwise disseminated.

The regional and global aggregates are then calculated as weighted averages using the denominator of the indicator as the weight.

Regional aggregates: Regional and global aggregates are calculated as weighted averages using the denominator of the indicator as the weight. As described previously, where publishable data are not available for a given country or year, values are imputed for the purpose of calculating the regional and global aggregates.

Sources of discrepancies: Nationally-published figures may differ from the international ones because of differences between national education systems and the International Standard Classification of Education (ISCED); or differences in coverage (i.e. the extent to which different types of education – e.g. private or special education – are included in one rather than the other).

Concepts:

- Electricity: Regularly and readily available sources of power (e.g. grid/mains connection, wind, water, solar and fuel-powered generator, etc.) that enable the adequate and sustainable use of ICT infrastructure for educational purposes.

- Internet for pedagogical purposes: Internet that is available for enhancing teaching and learning and is accessible by pupils. Internet is defined as a worldwide interconnected computer network, which provides pupils access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files, irrespective of the device used (i.e. not assumed to be only via a computer) and thus can also be
4.a.1 Proportion of schools offering basic services, by type of service

accessed by mobile telephone, tablet, PDA, games machine, digital TV etc.). Access can be via a fixed narrowband, fixed broadband, or via mobile network.

- Computers for pedagogical use: Use of computers to support course delivery or independent teaching and learning needs. This may include activities using computers or the Internet to meet information needs for research purposes; develop presentations; perform hands-on exercises and experiments; share information; and participate in online discussion forums for educational purposes. A computer is a programmable electronic device that can store, retrieve and process data, as well as share information in a highly-structured manner. It performs high-speed mathematical or logical operations according to a set of instructions or algorithms. Computers include the following types:
  - A desktop computer usually remains fixed in one place; normally the user is placed in front of it, behind the keyboard;
  - A laptop computer is small enough to carry and usually enables the same tasks as a desktop computer; it includes notebooks and netbooks but does not include tablets and similar handheld devices; and
  - A tablet (or similar handheld computer) is a computer that is integrated into a flat touch screen, operated by touching the screen rather than using a physical keyboard.

- Adapted infrastructure is defined as any built environment related to education facilities that are accessible to all users, including those with different types of disability, to be able to gain access to use and exit from them. Accessibility includes ease of independent approach, entry, evacuation and/or use of a building and its services and facilities (such as water and sanitation), by all of the building's potential users with an assurance of individual health, safety and welfare during the course of those activities.

- Adapted materials include learning materials and assistive products that enable students and teachers with disabilities/functioning limitations to access learning and to participate fully in the school environment.

- Accessible learning materials include textbooks, instructional materials,
4.a.1 Proportion of schools offering basic services, by type of service

assessments and other materials that are available and provided in appropriate formats such as audio, braille, sign language and simplified formats that can be used by students and teachers with disabilities/functioning limitations.

- Basic drinking water is defined as a functional drinking water source (MDG ‘improved’ categories) on or near the premises and water points accessible to all users during school hours.

- Basic sanitation facilities are defined as functional sanitation facilities (MDG ‘improved’ categories) separated for males and females on or near the premises.

- Basic hand-washing facilities are defined as functional hand-washing facilities, with soap and water available to all girls and boys.

Data availability: Countries with at least one data point over the period of 2010-2019: 140 countries for electricity, 113 countries for computers, 106 countries for Internet, 109 countries for water, 103 countries for sanitation, 105 countries for hand-washing facilities and 50 countries for adapted infrastructure.

Data Source 2: Cross-national Student Assessment Data

Data collection: Data is acquired from the administrators of cross-national assessment; typically, these are available for download publicly. UIS analyses this data to provide estimates of the indicator. When there is more than one data point available for a given level of schooling (primary or secondary), an average is used as the indicator.

Estimation method: The indicator is defined as the estimated percent of schools in a given assessment’s target school population which report having the specified infrastructure or service, \( S_i \):

\[
S_i = 100 \times E[1\{b_i = 1\}]
\]

where \( i \) denotes the specific infrastructure and \( b_i \) is binary variable defined from the dataset's questionnaires specifying whether the infrastructure or service exists at the school, \( 1\{...\} \) denotes the indicator function which takes value 1 if the expression is true and zero if false, and \( E[... \} \) denotes the population mean (expected value). The estimate of \( S_i \) follows the
4.a.1 Proportion of schools offering basic services, by type of service

estimation suggested by each cross-national assessment programme using school level data. See Annex 1 for explanation of the methodology used to estimate this indicator.

Note: For SEA-PLM 2019 data, the indicator is not the percent of school but rather the percent of students at schools with the specified infrastructure or service. Estimates from PISA 2018 are labeled as lower secondary.

Concepts
Annex 1 Table 2 presents the questionnaire used to collect data in the cross-national assessments included.

Data availability
Table A.1 in annex presents the cross-national assessments for which estimates are possible.
4.a.1 Proportion of schools offering basic services, by type of service

Annex: Methods used to estimate indicator values using cross-national assessments

Cross national assessments are sample-based and, as such, provide estimates of the proportion of schools with the given facility. Estimation methods followed those suggested by the respective organization providing the cross-national assessment data. All surveys utilized a two-stage sampling procedure, randomly selecting schools and within those classes or students. School-level (first stage) data was used to estimate the percentages of schools with the given facilities. Data was weighted by school sampling weights. The population which the sample of schools represented are presented in Table A.2 in the annex.
### 4.a.1 Proportion of schools offering basic services, by type of service

#### Table A1. Data collection related to school environment indicators

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Number of participants (includes sub-national entities in some cases; data may not be available for all countries for a given indicator)</th>
<th>Target population</th>
<th>electricity</th>
<th>internet for pedagogical purposes</th>
<th>computers for pedagogical purposes</th>
<th>adapted infrastructure for students with disabilities</th>
<th>basic drinking water</th>
<th>single-sex basic sanitation facilities</th>
<th>basic hand-washing facilities (WASH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PISA 2018</td>
<td>80 secondary schools with 15 year-old students</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>54 4th grade; 46 8th grade schools with 8th grade; schools with 4th grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>10 both grades schools with 2nd grade; schools with 6th grade</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 4.a.1 Proportion of schools offering basic services, by type of service

<table>
<thead>
<tr>
<th>Data collected on the following</th>
<th>SEAPLM 2019</th>
<th>6</th>
<th>5&lt;sup&gt;th&lt;/sup&gt; grade students</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>School type</td>
<td>SEAPLM 2019</td>
<td>6</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; grade students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>SEAPLM 2019</em></td>
<td>6</td>
<td></td>
<td>5&lt;sup&gt;th&lt;/sup&gt; grade students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>LLECE (TERCE)</em> 2013</td>
<td>16 both grades</td>
<td></td>
<td>schools with 3rd grade; schools with 6th grade</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.a.2 Percentage of students experiencing bullying in the last 12 months

Table A.2. School questionnaire items related to SDG 4.a.1

<table>
<thead>
<tr>
<th>Survey</th>
<th>Population</th>
<th>Questionnaire item</th>
<th>SDG 4.a.1 sub-indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>schools with 3rd grade students; schools with 6th grade students</td>
<td>¿Con cuáles de estos servicios cuenta la escuela? Luz eléctrica. Sí / No Agua potable. Sí / No</td>
<td>Electricity and basic drinking water</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¿Cuántos computadores hay en la escuela para uso de los estudiantes? Con conexión a Internet: No hay / Entre 1 y 10 / Entre 11 y 20 / Entre 21 y 30 / Más de 30 Sin conexión a Internet: No hay / Entre 1 y 10 / Entre 11 y 20 / Entre 21 y 30 / Más de 30</td>
<td>Internet for pedagogical purposes; computers for pedagogical purposes</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>schools with 2nd grade; schools with 6th grade</td>
<td>65. Is there in the school...? Electricity: yes/no Piped-in water: yes/no Another source of drinking water (well, borehole...): yes/no</td>
<td>Electricity; drinking water</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>secondary schools with 15 year-old students</td>
<td>The goal of the following set of questions is to gather information about the student-computer ratio for students in the &lt;national modal grade for 15-year-olds&gt; at your school. (Please enter a number for each response. Enter “0” (zero) if there are none.)</td>
<td>Internet for pedagogical purposes; computers for pedagogical purposes</td>
</tr>
</tbody>
</table>

At your school, what is the total number of students in the <national modal grade for 15-year-olds>?
Approximately, how many computers are available for these students for educational purposes?
## 4.a.2 Percentage of students experiencing bullying in the last 12 months

<table>
<thead>
<tr>
<th></th>
<th>Approximately, how many of these computers are connected to the Internet/World Wide Web?</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIMSS 2015 4th &amp; 8th</td>
<td>Math and science teachers’ classes of 4th grade &amp; 8th grade students (can be aggregated to school level)</td>
</tr>
<tr>
<td></td>
<td>Do the students in this class have computers (including tablets) available to use during their mathematics lessons? Yes / No</td>
</tr>
<tr>
<td></td>
<td>Do the students in this class have computers (including tablets) available to use during their science lessons? Yes / No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEA-PLM 5th grade</th>
<th>Schools with 5th grade</th>
<th>Which of the following facilities does your school have? (e) electricity, (h) safe drinking water, yes/no</th>
<th>Electricity; drinking water, single-sex basic sanitation facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Does your school have the following types of toilets? (b) separate boys toilets, (c) separate girls toilets</td>
<td></td>
</tr>
</tbody>
</table>
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.a.2 Percentage of students experiencing bullying in the last 12 months in a) primary, and b) lower secondary education

Definition
Percent of students subjected to bullying in the past 12 months (or alternative period as available in the source data) at the primary or secondary levels. Bullying is defined to include, when possible, physical, verbal and relational abuse. This scope reflects current research on bullying as well as the definitions for major international student assessments.

Data sources
Data for estimating this indicator included in the UIS dataset can be categorized into:
1) cross-national school health surveys which survey students within schools; and
2) cross-national student assessment surveys which also survey students within schools.

Data source 1: Cross-national health surveys
Data collection: Estimates from data sources are included in the UIS database: the Health Behavior in School-Aged Children (HBSC) survey and the Global School-based Student Health Survey (GSHS). Estimates for the HBSC were obtained from UNESCO (2019), and estimates for the GSHS were obtained from GSHS Country Fact Sheet series (GSHS 2020).

Calculation method: Estimates from UNESCO (2019) for the HBSC data are defined as follows: “the percentages represent median prevalence of students who reported being bullied on one or more days... in the past few months prior to the survey, in countries/territories that participated in the HBSC” (UNESCO 2019: 66). For the estimates by GSHS (2020), they are the “percentage of students who were bullied on one or more days during the 30 days before the survey.” HBSC disaggregate estimates by age, which consists of 11, 13 and 15 year-olds while the GSHS data is for children aged 11 to 15 but not disaggregated. For the UIS dataset, children aged 11 are defined as being primary level and...
4.a.2 Percentage of students experiencing bullying in the last 12 months

children aged 13 or older or defined as being at the secondary level for the HBSC data. Because the GSHS data currently included in the dataset are not disaggregated by age, these figures are treated as a secondary level estimate.

**Interpretation:** The GSHS and HBSC datasets measure bullying in a much shorter time period than the SDG indicator, at the past few months for the HBSC data and at the past 30 days for the GSHS data. These indicators are expected to be lower than estimates from the student assessment data described subsequently which span the past year when possible.

**Disaggregation:** estimates are disaggregated by sex.

**Data source 2: Cross-national student assessment surveys**

**Data collection:** Data is acquired from the administrators of cross-national assessment; typically, these are available for download publicly. UIS analyses this data to provide estimates of the indicator. Table 1 presents the surveys and the survey questions used to define bullying. Assessment data for grades 8 or higher and for 15 year-olds (PISA\(^1\)) are used for estimating bullying at the secondary level while grades 7 or lower are used for primary level estimates.

**Calculation method:** The indicator is estimated as the percent of students who have experienced any type of bullying in the past year. For assessment \(i\), the measure of prevalence of bullying for the assessment's target population \(B_i\) would be defined as:

\[
B_i = E \left[ 1 \{ b_1 = 1 \text{ or } b_2 = 1 \text{ or } \ldots \text{ or } b_{n_i} = 1 \} \right]
\]

where \(1\{\ldots\}\) denotes the indicator function which takes value 1 if the expression is true and zero if false. Variables \(b_1, \ldots, b_{n_i}\) denote the various types of bullying included in the question on what types of bullying the student may have experienced; these variables equal 1 if the student has experienced the type of bullying and zero if the student answers no. \(E[\ldots]\) denotes the population mean (expected value); the methodology for estimating the expected value of \(1 \{ b_1 = 1 \text{ or } b_2 = 1 \text{ or } \ldots \text{ or } b_{n_i} = 1 \}\) varies by assessment and depends on the assessment’s sampling design. Students who did not answer any of the bullying questions would be omitted from the calculation; for students that omitted some of the questions, the omissions would be treated as zeros. The target population would be that of the assessment but excluding those unwilling to answer any of the bullying questions. The time period, to match the SDG indicator definition, would be whether bullying was experienced at least once in a year.

\(^1\) PISA: Programme for International Student Assessment
4.a.2 Percentage of students experiencing bullying in the last 12 months

Table 1 presents the questions used in defining bullying in each assessment. Table A.3 presents the estimation methods used including weighting and estimation of standard errors.

Interpretation
The indicator offers an estimate of the percent of students experiencing bullying; however, there are slight variations in the definition of bullying, and important differences in the target population and their characteristics including age across the different assessments.

Disaggregation
Estimates are disaggregated by sex, socioeconomic status and urban and rural location (see Table A.1 for how these are defined in cross-national student assessment data).

Metadata points
The meta-data points indicate the source of data (Table 1 provides details for each data source). They also include standard errors and confidence intervals estimated based on the methodologies suggested by the assessment programmes (Table A.3).
### 4.a.2 Percentage of students experiencing bullying in the last 12 months

#### Table 1. Data sources and questions on bullying

<table>
<thead>
<tr>
<th>Data source</th>
<th>Target population</th>
<th>Bullying question(s)</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013 (TERCE)</td>
<td>6th grade students</td>
<td>Do any of these things happen to you when you are at school?</td>
<td>bullied: yes&lt;br&gt;not bullied: no&lt;br&gt;omitted: missing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I am afraid of one of my schoolmates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I feel threatened by one of my schoolmates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I fear that one of my schoolmates will hit me or hurt me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• My schoolmates make fun of me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• My schoolmates exclude me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• My schoolmates force me to do things that I don't want to do</td>
<td></td>
</tr>
<tr>
<td>PISA 2018</td>
<td>15 year-old secondary students</td>
<td>During the past 12 months, how often have you had the following experiences in school? (Some experiences can happen in social media)</td>
<td>bullied: “a few times a year”; “a few times a month”; “once a week or more”&lt;br&gt;not bullied: “never or almost never” (must be answered to all questions with valid responses to be classified as not bullied)&lt;br&gt;omitted: missing for all questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other students left me out of things on purpose</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other students made fun of me</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I was threatened by other students</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other students took away or destroyed things that belonged to me</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I got hit or pushed around by other students</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other students spread nasty rumours about me</td>
<td></td>
</tr>
</tbody>
</table>
### 4.a.2 Percentage of students experiencing bullying in the last 12 months

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>TARGET POPULATION</th>
<th>BULLYING QUESTION(S)</th>
<th>RESPONSES</th>
</tr>
</thead>
</table>
| TIMSS 2015  | 8th grade students| During this school year, how often have other students from your school done any of the following things to you (including through texting or the Internet)?  
• Made fun of me or called me names  
• Left me out of their games or activities  
• Spread lies about me  
• Stole something from me  
• Hit or hurt me (e.g., shoving, hitting, kicking)  
• Made me do things I didn't want to do  
• Shared embarrassing information about me  
• Posted embarrassing things about me online  
• Threatened me | Bullied: “At least once a week”; “Once or twice a month”; “A few times a year”  
Not bullied: “Never” (must be answered to all questions with valid responses to be classified as not bullied)  
omitted: missing for all questions |

| TIMSS 2015  | 4th grade students| During this school year, how often have other students from your school done any of the following things to you (including through texting or the Internet)?  
• Made fun of me or called me names  
• Left me out of their games or activities  
• Spread lies about me  
• Stole something from me  
• Hit or hurt me (e.g., shoving, hitting, kicking)  
• Made me do things I didn't want to do  
• Shared embarrassing information about me  
• Threatened me | Bullied: “At least once a week”; “Once or twice a month”; “A few times a year”  
Not bullied: “Never” (must be answered to all questions with valid responses to be classified as not bullied)  
omitted: missing for all questions |
4.a.2 Percentage of students experiencing bullying in the last 12 months

Annex - Metadata for estimating SDG indicators from student level data in cross national student assessments

Definition of sub-populations

Female and male: The dataset used to estimate the indicators include a question asking whether the student is male or female. For TIMSS, the administrative record of the sex of the student was used following how TIMSS reports learning achievement scores by sex.

Urban and rural: All assessments ask about the type of location in which the school is located to the school director; however, only LLECE 2013 asks explicitly whether the school is located in an urban or a rural area. The other surveys ask the question in various ways included the number of inhabitants or by description. See Table A.1 for the questions from each assessment and how they were mapped to urban or rural.

High and low socioeconomic: All assessments except TIMSS provide a measure of the socioeconomic status (SES) of students. This is typically based on the response by students about assets at home as well as education of parents.

LLECE 2013 used the responses of the family questionnaire to generate its index.

PASEC 2014 and PISA 2018 used student responses; no index was generated for the PASEC 2014 2nd grade students given their young age and reliability of answers.

TIMSS reports an index of home learning resources based on household possessions reported by students and this was used as a measure of socioeconomic status. To define high and low SES students, the median was calculated for each country, student above the median were defined as high SES while those below were defined as low SES. See Table A.2 for the names of the variables used to define high and low SES in each assessment.

Non-response and small sample sizes: Indicator estimates were not reported for sub-populations if data for the sub-population was available for less than 90 percent of sampled students or if the number of observations for a particular sub-population was less than 100.

Standard errors and confidence intervals methodology
The suggested methodology for estimating standard errors and subsequent confidence intervals varies by assessment and aim to account for clustering at the school-level. All surveys suggest using replicate methods in which the sample variation is obtained from variously defined sub-samples that mimic the sample design; the variation in estimates among the replicates provides an estimate of the sampling variation. The suggested methods were used for all assessments except LLECE 2013. For this survey, replicate weights

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4.a.2 Percentage of students experiencing bullying in the last 12 months

were provided with each of the learning achievement datasets; however, a large number of students in the background dataset (which included the responses to the bullying and home language questions) were not included in the student achievement dataset. In order to maximize the background data, a linearization method for estimating the standard errors robust to clustering at the school level was used. Table A-3 describes the methodology used for each assessment.
4.a.2 Percentage of students experiencing bullying in the last 12 months

Table A1. Definition of urban and rural sub-populations

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Population</th>
<th>Question</th>
<th>Responses (mapping)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Grades 3 and 6</td>
<td>How would you characterize the area where your school is located?</td>
<td>In an area considered rural (rural) In an area considered urban (urban)</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grades 2 and 6</td>
<td>Your school is located in...</td>
<td>A town (urban) A suburb of a big city (urban) A big village (hundreds of homesteads) (rural) A small village (dozens of homesteads) (rural)</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>15 year-olds</td>
<td>Which of the following definitions best describes the community in which your school is located?</td>
<td>A village, hamlet or rural area (fewer than 3 000 people) (rural) A small town (3 000 to about 15 000 people) (rural) A town (15 000 to about 100 000 people) (urban) A city (100 000 to about 1 000 000 people) (urban) A large city (with over 1 000 000 people) (urban)</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>Grades 4 and 8</td>
<td>Which best describes the immediate area in which your school is located?</td>
<td>Urban–Densely populated (urban) Suburban–On fringe or outskirts of urban area (urban) Medium size city or large town (urban) Small town or village (rural) Remote rural (rural)</td>
</tr>
</tbody>
</table>

Table A2. Variables used to define high and low SES students

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Population</th>
<th>Variable</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Grades 3 and 6</td>
<td>Index of the family’s socioeconomic status (isecf)</td>
<td>Parents</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grade 2</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grade 6</td>
<td>Socioeconomic index of the student’s family (ses)</td>
<td>Students</td>
</tr>
<tr>
<td>PISA 2018</td>
<td>15 year-olds</td>
<td>Index of economic, social and cultural status (escs)</td>
<td>Students</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>4th grade</td>
<td>Index of home resources for learning (asbghrl)</td>
<td>Students</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>8th grade</td>
<td>Index of home educational resources (bsbgher)</td>
<td>Students</td>
</tr>
</tbody>
</table>

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4.a.2 Percentage of students experiencing bullying in the last 12 months

Table A3. Methodology for calculating standard errors by assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Method</th>
<th>Reference for formulas</th>
<th>Software routine</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Linearized</td>
<td>StataCorp 2013</td>
<td>SVY module for Stata (StataCorp)</td>
</tr>
<tr>
<td></td>
<td>Jackknife repeated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Jackknife repeated</td>
<td>PASEC 2017</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td></td>
<td>replication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PISA 2018</td>
<td>Jackknife repeated</td>
<td>OECD 2009</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td></td>
<td>replication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>replication</td>
<td>Foy &amp; LaRoche (2016)</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
</tbody>
</table>
4.a.2 Percentage of students experiencing bullying in the last 12 months

References


SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

4.a  Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.a.3 Number of attacks on students, personnel and institutions

**Definition**

Number of violent attacks, threats or deliberate use of force in a given time period (e.g. the last 12 months, a school year or a calendar year) directed against students, teachers and other personnel or against education buildings, materials and facilities, including transport. The indicator focuses on attacks carried out for political, military, ideological, sectarian, ethnic or religious reasons by armed forces or non-state armed groups.

*Attacks on education* include the following sub-categories:

- **Attacks on schools**: targeted violent attacks on preschool, kindergarten, primary, and secondary school buildings or infrastructure by state military forces or non-state armed groups in the form of arson; suicide, car, or other bombs aimed at a school; or artillery fire directed at a school. In addition, this category includes indiscriminate attacks that result in the damage or destruction of school infrastructure as well as explosions that occur in close proximity to a school.

- **Attacks on students, teachers, and other education personnel**: killings, injuries, torture, abductions, forced disappearances, or threats of violence, including coercion or extortion involving violent threats directed towards students and education staff who work at the primary and secondary levels. Since it is sometimes difficult to identify why a teacher or school staff member is killed if the assassination occurs outside of school, this category also includes such attacks in cases where there is an established pattern of that kind of violence. The category of attacks on students, teachers, and other education personnel also includes cases where police or state security forces violently repress student protests that either occur at school, or, if they occur off-campus, focus on education-related policies and laws.
• **Military use of schools and universities:** cases in which armed forces or non-state armed groups take over schools or universities as bases, barracks and temporary shelters to house soldiers or fighters, fighting positions, weapons storage facilities, detention and interrogation centres, or for other military purposes.

• **Recruitment of children at schools or along school routes:** cases in which armed forces or nonstate armed groups use schools or school routes as locales for recruiting children under the age of 18 into their fighting forces in violation of international standards.

• **Sexual violence by parties to the conflict:** incidents of sexual abuse and harassment perpetrated at schools or universities or along school routes.

• **Attacks on higher education:** include targeted violent attacks on universities in the form of bombings, airstrikes, arson, or other means, as well as targeted killings, abductions, or threats directed at university students, faculty, or staff. The category includes cases of violent repression of student protests that either occur at institutions of higher education, or, if they occur off-campus, focus on education-related policies and laws.

**Purpose**
The indicator is a broad measure of the safety of learning environments, particularly in relation to armed conflict and political violence. Available data for global tracking are presently collected from reporting by a wide variety of stakeholders, including national and international NGOs working at the country-level and national and international media reports.

**Calculation method**
The indicator is calculated based on the reported number of incidents in which students, education personnel or educational facilities are attacked, as defined above.

**Interpretation**
A higher value indicates a large number of attacks on education are reported more frequently. In some cases, only multi-year information is available. In these cases, the total for the multi-year period is replicated across years, with a footnote indicating that it is not comparable to other annual totals.

**Type of data source**
In-depth review and assessment of information on attacks on education from multiple sources.

**Disaggregation**
Information is not currently disaggregated.
**Data required**
Information on the numbers and types of attacks on students, education personnel and educational infrastructure.

**Data sources**
The calculation of this indicator relies on three types of data sources: reports released by UN agencies, development and humanitarian NGOs, human rights organizations, government bodies, and think tanks; media reports; and information shared with GCPEA by staff members of international and national organizations working in the countries profiled in this study.

**Quality assurance**
The Global Coalition to Protect Education from Attack (GCPEA), for its report *Education under Attack*, maintains the database used to produce this indicator. GCPEA defines the protocol for reporting and harmonising these data which are compiled from three main sources (see section above on Data sources).

**Limitations and comments**
This indicator compiles information from different sources that are subject to different levels of verification. Furthermore, the sources of data vary considerably from country to country, which are determined in part by whether a country has any established mechanisms for monitoring and reporting. See *Education under Attack 2020* (GCPEA 2020), pp. 88-96, for more details.

**References**
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.b  By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training, information and communications technology, technical, engineering and scientific programmes in developed countries and other developing countries

4.b.1 Volume of official development assistance flows for scholarships by sector and type of study

Definition
Gross disbursements of total official development assistance (ODA) for scholarships in donor countries expressed in US dollars at the average annual exchange rate.

Scholarships are financial aid awards for individual students and contributions to trainees. The beneficiary students and trainees are nationals of developing countries. Financial aid awards include bilateral grants to students in institutions of higher education following full-time studies or training courses in the donor country.

Purpose
ODA is the accepted measure of international development co-operation. Total ODA flows to developing countries quantify the public effort that donors provide for scholarships. The data cover official international assistance to provide education places for developing country nationals in donor country educational institutions.

Calculation method
The sum of gross disbursements of total official development assistance for scholarships for study abroad by sector and type of study awarded to students from the beneficiary country expressed in US dollars.
**Interpretation**
A high value indicates that there is greater expenditure on students from the given beneficiary country to study abroad. It does not indicate the number of students being supported.

**Type of data source**
Administrative data.

**Disaggregation**
By aid provider, recipient country, type of finance, etc.

**Data required**
Gross disbursements of total official development assistance for scholarships for study abroad by sector and type of study awarded to students from the beneficiary country.

**Data sources**
Administrative data from donor countries and other aid providers on gross disbursements of total official development assistance to education.

**Quality assurance**
The Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) compiled data used to produce this indicator based on returns submitted by its member countries and other aid providers. DAC-OECD defines the protocol for reporting these data.

**Limitations and comments**
The data only address international concessional flows provided by governments. Detailed, internationally-comparable data on scholarships for developing country nationals provided by universities, colleges, foundations, NGOs and other sources are generally lacking.
**SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

**METADATA**

**Target 4.c** By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

**4.c.1 Proportion of teachers with the minimum required qualifications, by education level**\(^1\)

**Definition**
Percentage of teachers by level of education taught (pre-primary, primary, lower secondary and upper secondary education) who have received at least the minimum organized pedagogical teacher training pre-service and in-service required for teaching at the relevant level in a given country, in a given academic year. Ideally the indicator should be calculated separately for public and private institutions.

**Purpose**
Teachers play a key role in ensuring the quality of education provided. Ideally all teachers should receive adequate, appropriate and relevant pedagogical training to teach at the chosen level of education and be academically well-qualified in the subject(s) they are expected to teach. This indicator measures the share of the teaching work force which is pedagogically well-trained.

**Calculation method**
The number of teachers in a given level of education, in a given academic year who are trained is expressed as a percentage of all teachers in that level of education, in that academic year.

---

\(^1\) Note: Refinement of the indicator name approved by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs) on 13 March and 2 April 2020. Final approval pending the 52nd session of the Statistical Commission in March 2021.
\[ PTT_{n,t} = \frac{TT_{n,t}}{T_n} \]

where:

\( PTT_{n,t} \) = percentage of trained teachers at level \( n \) of education in year \( t \)
\( TT_{n,t} \) = trained teachers at level \( n \) of education in year \( t \)
\( T_n \) = total teachers at level \( n \) of education in year \( t \)
\( n \) = 02 (pre-primary), 1 (primary), 2 (lower secondary), 3 (upper secondary) and 23 (secondary)

**Interpretation**
A high value indicates that most students are being taught by teachers who are pedagogically well-trained to teach.

**Type of data source**
Administrative data.

**Disaggregation**
By sex and by level of education. Location is not currently collected at the global level but this could be considered in the future.

**Data required**
Number of teachers at each level of education who are trained and total number of teachers at each level in a given academic year.

**Data sources**
Administrative data from schools and other organized learning centres.

**Quality assurance**
The indicator should be based on available data on trained teachers for the given level of education, from all types of educational institutions in the country (public and private). The UIS sets standards and maintains the global database used to produce this indicator.

**Limitations and comments**
National minimum training requirements can vary widely from one country to the next. This variability between countries lessens the usefulness of global tracking because the indicator would only show the percent reaching national standards, not whether teachers in different countries have similar levels of training. To address this limitation, the UIS has initiated in 2019 the development of an international classification of teacher training programmes that can be used for comparisons of such programmes across countries.
Metadata for the global and thematic indicators for the follow-up and review of SDG 4 and Education 2030
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

4.c.2 Pupil-trained teacher ratio by education level

Definition
Average number of pupils per trained teacher at each level of education (pre-primary, primary, lower and upper secondary education) in a given academic year.

A trained teacher is one who has received at least the minimum organized pedagogical teacher training pre-service and in-service required for teaching at the relevant level in a given country in a given academic year.

Purpose
To measure trained teacher workloads and human resource allocations in educational institutions, and to give a general indication of the average amount of time and individual attention a pupil is likely to receive from trained teachers.

Since well-trained teachers play a key role in ensuring the quality of education provided, the pupil/trained teacher ratio is considered an important determinant of learning outcomes and an indicator of the overall quality of an education system.

Calculation method
The total number of pupils and students in the relevant level in a given academic year, expressed as a percentage of the number of trained teachers in the same level in that academic year.

$$ PTTTR_{n,t} = \frac{E_{n,t}}{TT_{n,t}} $$

where:
PTTTR$_{n,t}$ = pupil-trained teacher ratio at level $n$ of education in year $t$
\[ E_{n,t} = \text{pupils enrolled in level } n \text{ of education in year } t \]
\[ TT_{n,t} = \text{trained teachers at level } n \text{ of education in year } t \]
\[ n = 02 (\text{pre-primary}), 1 (\text{primary}), 2 (\text{lower secondary}), 3 (\text{upper secondary}) \text{ and 23 (secondary)} \]

**Interpretation**
The higher the pupil/ trained teacher ratio, the lower the relative access of pupils to trained teachers. Results can be compared with established national norms on the number of pupils per trained teacher for each level of education.

**Type of data source**
Administrative data.

**Disaggregation**
By level of education and type of institution (public/private).

**Data required**
Number of pupils and trained teachers at each level of education in a given academic year.

**Data sources**
Administrative data from schools and other organized learning centres.

**Quality assurance**
The indicator should be based on available data on students and on trained teachers for the given level of education, from all types of educational institutions in the country (public and private). The UIS sets standards and maintains the global database used to produce this indicator.

**Limitations and comments**
The ‘ideal’ pupil/trained teacher ratios may depend on a wide variety of complex factors, including the age and academic needs of the pupils represented in the ratio (younger children or those with special educational needs typically require more time, attention, and instructional support from teachers) or the experience, skill, and effectiveness of the teachers (highly skilled teachers may be able to achieve better academic results with larger classes than less skilled teachers with smaller classes).

In calculating and interpreting this indicator, one should take into account the existence of part-time teaching, school-shifts, multi-grade classes and other practices that may affect the precision and meaningfulness of pupil/teacher ratios. When feasible, the number of part-time teachers should be converted to ‘full-time equivalent’ numbers of teachers; a double-
shift teacher should be counted twice, etc. Ideally, all staff involved in direct classroom-teaching roles should be included in the calculations.

Pupil/teacher ratios are not equivalent to the average class size. It is important to note that national teacher training requirements can vary from one country to the next. To address this limitation, the UIS has initiated the development of an international classification of teacher training programmes that can be used for comparisons of such programmes across countries.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**METADATA**

**Target 4.c** By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

**4.c.3 Percentage of teachers qualified according to national standards, by level of education and type of institution**

**Definition**
Percentage of teachers by level of education taught (pre-primary, primary, lower secondary and upper secondary education) who have at least the minimum academic qualifications required for teaching their subjects at the relevant level in a given country, in a given academic year. Ideally the indicator should be calculated separately for public and private institutions.

**Purpose**
Teachers play a key role in ensuring the quality of education provided. Ideally all teachers should receive adequate, appropriate and relevant pedagogical training to teach at the chosen level of education and be academically well-qualified in the subject(s) they are expected to teach. This indicator measures the share of the teaching work force which is academically well-qualified.

**Calculation method**
The number of teachers in a given level of education in a given academic year who are qualified is expressed as a percentage of all teachers in that level of education in that academic year.

\[
PQT_{n,t} = \frac{QT_{n,t}}{T_{n,t}}
\]

where:

\(PQT_{n,t}\) = percentage of qualified teachers at level \(n\) of education in year \(t\)

\(QT_{n,t}\) = qualified teachers at level \(n\) of education in year \(t\)
$$T_{n,t} = \text{total teachers at level } n \text{ of education in year } t$$

$$n = 02 \text{ (pre-primary), 1 (primary), 2 (lower secondary), 3 (upper secondary) and 23 (secondary)}$$

**Interpretation**
A high value indicates that students are being taught by teachers who are academically well qualified in the subjects they teach.

**Type of data source**
Administrative data.

**Disaggregation**
By sex, level of education and type of institution (public/private). Location is not currently collected at the global level but this could be considered in the future.

**Data required**
Number of teachers at each level of education who are qualified and total number of teachers at each level in a given academic year.

**Data sources**
Administrative data from schools and other organized learning centres.

**Quality assurance**
The indicator should be based on available data on qualified teachers for the given level of education, from all types of educational institutions in the country (public and private). The UIS sets standards and maintains the global database used to produce this indicator.

**Limitations and comments**
It is important to note that national academic qualification requirements can vary from one country to the next. This variability between countries lessens the usefulness of global tracking because the indicator would only show the percent reaching national standards, not whether teachers in different countries have similar levels of academic qualifications. To address this limitation, the UIS has initiated in 2019 the development of an international classification of teacher training programmes that can be used for comparisons of such programmes across countries.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Metadata

Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States.

4.c.4 Pupil-qualified teacher ratio by level of education

Definition
Average number of pupils per qualified teacher at each level of education (pre-primary, primary, lower and upper secondary education) in a given academic year.

A qualified teacher is one who has at least the minimum academic qualifications required for teaching their subjects at the relevant level in a given country in a given academic year.

Purpose
To measure qualified teacher workloads and human resource allocations in educational institutions, and to give a general indication of the average amount of time and individual attention a pupil is likely to receive from qualified teachers.

Since qualified teachers play a key role in ensuring the quality of education provided the pupil/qualified teacher ratio is considered an important determinant of learning outcomes and an indicator of the overall quality of an education system.

Calculation method
The total number of pupils and students in the relevant level in a given academic year expressed as a percentage of the number of qualified teachers in the same level in that academic year.

\[
PQTR_{n,t} = \frac{E_{n,t}}{QT_{n,t}}
\]

where:
\( PQTR_{n,t} \) = pupil-qualified teacher ratio at level \( n \) of education in year \( t \)
\( E_{n,t} \) = pupils enrolled in level \( n \) of education in year \( t \)
\( QT_{n,t} \) = qualified teachers at level \( n \) of education in year \( t \)
\( n = 02 \) (pre-primary), 1 (primary), 2 (lower secondary), 3 (upper secondary) and 23 (secondary)

**Interpretation**
The higher the pupil/qualified teacher ratio, the lower the relative access of pupils to qualified teachers. Results can be compared with established national norms on the number of pupils per qualified teacher for each level of education.

**Type of data source**
Administrative data.

**Disaggregation**
By level of education and type of institution (public/private).

**Data required**
Number of pupils and qualified teachers at each level of education in a given academic year.

**Data sources**
Administrative data from schools and other organized learning centres.

**Quality assurance**
The indicator should be based on available data on students and on qualified teachers for the given level of education, from all types of educational institutions in the country (public and private). The UIS sets standards and maintains the global database used to produce this indicator.

**Limitations and comments**
The ‘ideal’ pupil/qualified teacher ratios may depend on a wide variety of complex factors, including the age and academic needs of the pupils represented in the ratio (younger children or those with special educational needs typically require more time, attention, and instructional support from teachers) or the experience, skill, and effectiveness of the teachers (highly skilled teachers may be able to achieve better academic results with larger classes than less skilled teachers with smaller classes).

In calculating and interpreting this indicator, one should take into account the existence of part-time teaching, school-shifts, multi-grade classes and other practices that may affect the precision and meaningfulness of pupil/teacher ratios. When feasible, the number of part-time teachers should be converted to ‘full-time equivalent’ numbers of teachers; a double-shift teacher should be counted twice, etc. Ideally, all staff involved in direct classroom-teaching roles should be included in the calculations.
Pupil/teacher ratios are not equivalent to the average class size. It is also important to note that national academic qualification requirements can vary from one country to the next. To address this limitation, the UIS has initiated the development of an international classification of teacher training programmes that can be used for comparisons of such programmes across countries.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

**Metadata**

Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

4.c.5 Average teacher salary relative to other professions requiring a comparable level of qualifications

**Definition**

The indicator is defined as the ratio of annual statutory teacher compensation for a teacher with typical qualifications and 15 years of experience (numerator) to the annual earnings of similarly qualified individuals (denominator).

**Numerator:** The numerator is statutory salaries of teachers with 15 years of experience with typical qualifications where the preferred definition of typical qualifications is the level of qualifications and training held by the largest proportion of teachers.

**Denominator:** The measure of earnings for individuals with a comparable level of qualification will depend on data available for each country, and the order preference is:

1) the average earnings of tertiary educated workers weighted by teacher qualification

2) the average earnings of tertiary educated workers, or

**Purpose**

The indicator provides a comparison between teacher salaries and similarly qualified individuals based on a definition that allows a large number of countries to report.

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1 This document was prepared by the Learning Outcome team at the UIS with the support of Kevin Macdonald and have benefited from comments from the OECD Secretariat and the chair of the TCG working group on teacher’s personnel’s chair, Robert Rakocevic.

*Updated February 2021*
4.c.5 Average teacher salary relative to other professions requiring a comparable level of qualifications

Calculation method
The indicator is calculated as a ratio. In countries where statutory salaries vary sub-nationally (e.g.: within sub-national jurisdictions including provinces or states), the statutory salary should be calculated as a weighted average based on the relative share of teaching staff for the level of education. In cases where the denominator earnings data is from a year or more before the teacher salary data, the latest year’s earnings data is used, adjusted for consumer price inflation since the year with the earnings data. If the earnings data lags the teacher salary data by more than five years, then a future value of earnings is used if there is one within five years; otherwise, the indicator will be treated as missing.

Interpretation
The indicator provides a measure of salaries of teachers who are approximately at the midpoint of their teaching career. Note that this is not an average for teachers, and these salaries may not represent those of teachers whose salaries are not subject to the statutes. As a result, private school teacher salaries may not be reflected in this indicator.

Data source
The UIS/UOE survey collects data on the statutory salaries of teachers with 15 years’ experience and typical qualifications. ILOSTAT currently publishes average monthly earnings for workers in professional occupations; this, multiplied by 12 months, serves as the denominator for countries without national data on earnings of workers by level of education. Note that countries participating in the OECD’s Education at a Glance already have measures of the indicator: Education at a Glance publishes statutory teacher salaries of teachers with 15 years’ experience and typical qualifications as a ratio to either the average earnings of tertiary educated workers weighted by the proportion of teachers with each level of education or to the average earnings of tertiary educated workers without weighting, information that is collected by the OECD.²,³

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Updated February 2021
4.c.5 Average teacher salary relative to other professions requiring a comparable level of qualifications

Table 1. UIS 2019 questionnaire on teacher salaries

<table>
<thead>
<tr>
<th>A11: Annual statutory teacher compensation (units of national currency) in public institutions, by teaching level of education- all programmes (general and vocational)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual statutory teacher compensation</td>
</tr>
<tr>
<td>ISCED 02</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Starting teacher with a minimum level of qualification</td>
</tr>
<tr>
<td>Starting teacher with a typical level of qualification</td>
</tr>
<tr>
<td>Teacher with typical qualifications and 15 years of experience</td>
</tr>
</tbody>
</table>

References


Updated February 2021
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

METADATA

Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

4.c.6 Teacher attrition rate by education level

Definition
Percentage of teachers at a given level of education leaving the profession in a given school year.

Purpose
Teacher shortage is a significant contributing factor that widens equity gaps in education access and learning. Assessing and monitoring teacher attrition is essential to ensuring a sufficient supply of qualified and well-trained teachers as well as to their effective deployment, support and management.

Calculation method
The number of leavers is estimated by subtracting the number of teachers in year \( t \) from those in year \( t-1 \) and adding the number of new entrants to the teaching workforce in year \( t \). The attrition rate is the number of leavers expressed as a percentage of the total number of teachers in year \( t-1 \).

\[
TAR_{n,t} = \frac{(T_{n,t-1} - T_{n,t}) + NET_{n,t}}{T_{n,t-1}}
\]

where:
- \( TAR_{n,t} \) = teacher attrition rate from level \( n \) of education in year \( t \)
- \( T_{n,t} \) = teachers in level \( n \) of education in year \( t \)
- \( T_{n,t-1} \) = teachers in level \( n \) of education in year \( t-1 \)
- \( NET_{n,t} \) = new entrant teachers to level \( n \) of education in year \( t \)
- \( n \) = 02 (pre-primary education), 1 (primary education), 2 (lower secondary education), 3 (upper secondary education) and 23 (secondary education)
Interpretation
A high value indicates high levels of teacher turnover which can be disruptive for the learning of students. Where teachers teach for 30-40 years, the attrition rate will be well below 5%. Attrition rates above 10% indicate that the average teaching career lasts only 10 years.

Type of data source
Administrative data.

Disaggregation
By sex and level of education.

Data required
Number of teachers at each level of education in years \( t \) and \( t-1 \) and number of new entrant teachers at each level in year \( t \).

Data sources
Administrative data from schools and human resources records on educational personnel.

Quality assurance
The indicator should be based on teacher data for the given level of education, from all types of educational institutions (public and private) for two consecutive academic years (\( t \) and \( t-1 \)), and on newly recruited teacher data for the same level of education in academic year \( t \).

Limitations and comments
In calculating this indicator, care should be exercised to avoid double counting regarding teachers that teach more than one level of education. Also, the existence of part-time teaching, school-shifts, multi-grade classes and other practices that may affect the precision of the number of teachers and the new entrants to the teaching profession should be taken into account.

This indicator does not provide information about the reasons why teachers leave the profession. Analysis of factors leading to teacher attrition usually requires detailed data collection (e.g. survey of teachers who have left the profession, annual school censuses) which may be challenging due to low response rates or large numbers of teachers leaving the profession for unknown reasons.
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Target 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

Definition
Percentage of teachers who received in-service training in the last 12 months by type of training.

Purpose
The proposed indicator is designed to match SDG 4.c.7 as closely as possible given the sampling design and data collection instruments of CNAs and teacher surveys.

Data sources: estimates calculated by the UIS using cross-national learning assessments and estimates reported by the OECD based on TALIS data.

Metadata points: The metadata points indicate the source of data (Table 1 provides details for each data source). The estimates provided by UIS also include standard errors and confidence intervals estimated based on the methodologies suggested by the assessment programmes.

Definition of professional development:
Data Source 1: Cross-national learning assessment estimates by UIS

Estimation method: The calculation method varied by type of survey (see Table 1). Estimates were made following the guidelines provided by each survey on how to estimate teacher-level indicators. In general, teachers were defined to have either received in-service training in the past 12 to 24 months based on their responses to their respective questionnaires. An indicator variable was defined for each teacher equal to one if they had...
received in-service training, zero if they had not, and missing if there was no response to the questionnaire items on recent teacher training.

For surveys whose teacher data is representative of teachers in the country or jurisdiction, the indicator is calculated as the percentage of teachers who received in-service training as a mean of the indicator variable (weighted by the appropriate sample weights). For surveys whose teacher data is representative of students’ teachers, the unit of measure is the student. In which case, an indicator variable is defined for students whose value equals that of their teacher. The indicator is calculated as the percentage of students whose teachers received in-service training as a mean of student indicator value (weighted by the appropriate sample weights). In some surveys, students have more than one teacher, and the average of his or her teacher's indicator variable is used.

For PISA 2015 and 2018 teacher data, estimates are computed using the grade non-response adjusted school base weight and standard errors are estimated to be robust to intra-cluster correlation at the school level using a linearized model as part of the SVY module for Stata.

For TIMSS 2015, the unit of analysis was each teacher’s-student combination and the teacher weight was used; standard errors were estimated as described in the common meta-data annexe below.

For LLECE, the same approach was applied with the sample weight divided by the number of teachers per student following TIMSS 2015.

**Interpretation:** The indicator may be interpreted as either the percent of teachers or percent of students’ teachers receiving in-service training in the past 12 to 24 months, depending on the survey (see Table 1).

**Disaggregation:** By level of schooling, by teacher sex, and urban or rural location (see Annex for definition of urban and rural location by assessment). Note that estimates for sub-populations are representative of the population that would respond to the question identifying the sub-population. Given that response rates to the questions defining the sub-populations are generally not 100 percent in a sample, the estimated mean for the target population as a whole generally differs from the target population which responds to the sub-population question. As a result, for a particular disaggregation, the average of the indicator for the target population for a country may not lie between the averages of the two sub-populations. In addition, in cases where one of the two categories of a sub-population (e.g.: female and male) is not reported (see non-response and small sample size below), then the other category is also not reported. For example, if there is insufficient sample size or response rate for rural areas for a particular year and country and consequently no reported value for rural areas, then urban areas are also not reported for that particular year and country.
Data Source 2: OECD estimates using TALIS

Estimation method: TALIS is representative of teachers in ISCED 2 level schools (and optionally other levels depending on country participation), sampling schools and then teachers and school leaders within these schools. The OECD reports the percent of teachers who have participated in professional development activities in the past 12 months. See indicator questionnaire in Table 1 below.

Interpretation: Because the OECD TALIS data is representative of teachers in the specified level of schooling (typically ISCED 2), the indicator can be interpreted as a percentage of teacher as specified in the SDG indicator. This differs from the learning assessments described above in which only estimates of students' teachers are possible.

Disaggregation: The data included in the UIS dataset includes only the publicly available OECD estimates which are not disaggregated.

Measurement points: When there is more than one estimate within a level of education, the average of the levels is used.
<table>
<thead>
<tr>
<th>Data source</th>
<th>Target population</th>
<th>Recent in-service training questionnaire items</th>
<th>Mapping to indicator</th>
</tr>
</thead>
</table>
| LLECE 2013 (TERCE)| Teachers of 3rd grade students; teachers of 6th grade students                    | Have you participated in any of the following professional development activities in the last two years? Check all relevant answers:  
  • Obtained a Master's Degree  
  • Obtained a diploma  
  • Professional development course (60 hours or more) in language, mathematics, sciences, or another subject related to teaching (separate items)  
  • Have not participated in any professional development | Yes if any of the responses (except have not participated...) were selected. No if have not participated was selected. Missing if no responses were selected. |
| PASEC 2014        | Teachers of 2nd grade students; teachers of 6th grade students                    | Have you received additional on-the-job training (educational course, training seminar, educational resource and development centre...) during the past two years? Yes or no | Mapped as stated; missing if no answer.                                              |
| PISA 2018         | Teachers of the national modal grade for 15 year-olds (excluding those teaching language classes as they were given an alternate questionnaire that did not include this question) | During the past 12 months, did you participate in any of the following professional development activities? (yes or no to the following)  
  • Courses / workshops (e.g.: on subject matter or methods and/or other education-related topics)  
  • Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational issues)  
  • Observation visits to other schools | Yes if yes to any of these; No if no to all of them that were answered. Missing if all are unanswered. |
Table 1. Data sources, target population, and questions on recent in-service training

- Observation visits to business premises, public organisations, non-governmental organisations
- In-service training courses in business premises, public organisations, non-governmental organisations

During the last 12 months, did you participate in any of the following activities? (yes or no to the following)
- Qualification programme (e.g. a <degree programme>)
- Participation in a network of teachers formed specifically for the professional development of teachers
- Individual or collaborative research on a topic of interest to you professionally
- Mentoring and/or peer observation and coaching, as part of a formal school arrangement
- Reading professional literature (e.g. journals, evidence based papers, thesis papers)

Note: the following activity was also included under this question but excluded from this list as it does not fit well with the definition of in-
Table 1. Data sources, target population, and questions on recent in-service training

<p>| Indicator data reported by UIS is taken from OECD, TALIS 2018 Database, Table I.5.1. |
| TALIS 2018 | Teachers of lower secondary education | During the last 12 months, did you participate in any of the following professional development activities? a) Courses/seminars attended in person b) Online courses/seminars c) Education conferences where teachers and/or researchers present their research or discuss educational issues. d) Formal qualification programme (e.g. a degree programme) e) Observation visits to other schools f) Observation visits to business premises, public organisations, or nongovernmental organisations g) Peer and/or self-observation and coaching as part of a formal school arrangement h) Participation in a network of teachers formed specifically for the professional development of teachers i) Reading professional literature j) Other |</p>
<table>
<thead>
<tr>
<th>PISA 2015</th>
<th>Teachers of the national modal grade for 15 year-olds (and adjacent grade in some cases)</th>
<th>During the last 12 months, did you participate in any of the following activities? (Please select one response in each row.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Qualification programme (e.g. a &lt;degree programme&gt;)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Participation in a network of teachers formed specifically for the professional development of teachers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Individual or collaborative research on a topic of interest to you professionally</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mentoring and/or peer observation and coaching, as part of a formal school arrangement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reading professional literature (e.g. journals, evidence-based papers, thesis papers)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engaging in informal dialogue with your colleagues on how to improve your teaching</td>
</tr>
</tbody>
</table>
| TIMSS 2015 | Teachers of 4<sup>th</sup> grade students; teachers of 8<sup>th</sup> grade students | M10 In the past two years, how many hours in total have you spent in formal <in-service / professional development> (e.g., workshops, seminars, etc.) for mathematics? (check one only)  
- none  
- less than 6 hours  
- 6 – 15 hours  
- 16 – 35 hours  
- more than 35 hours | No if answered none to both questions; otherwise yes unless no answer for both question, then coded as missing. Teachers that teach only mathematics or science may be asked only one of these two questions, in which case, the unanswered question is treated as missing.  
S9 In the past two years, how many hours in total have you spent in formal <in-service/professional development> (e.g., workshops, seminars, etc.) for science? responses as above |
Annex: Metadata for estimating SDG indicators from student level data in cross national student assessments

Definition of sub-populations

Female and male: The dataset used to estimate the indicators include a question asking whether the student is male or female. For TIMSS, the administrative record of the sex of the student was used following how TIMSS reports learning achievement scores by sex.

Urban and rural: All assessments ask about the type of location in which the school is located to the school director; however, only LLECE 2013 asks explicitly whether the school is located in an urban or rural area. The other surveys ask the question in various ways included the number of inhabitants or by description. See Table 1 for the questions from each assessments and how they were mapped to urban or rural.

High and low socioeconomic status: All assessments except TIMSS provide a measure of the socioeconomic status of students (SES). This is typically based on the response by students about assets at home as well as education of parents. LLECE 2013 used the responses of the family questionnaire to generate its index. PASEC 2014 and PISA 2018 used student responses; no index was generated for the PASEC 2014 2nd grade students given their young age and reliability of answers. TIMSS reports an index of home learning resources based on household possessions reported by students and this was used as a measure of socioeconomic status. To define high and low SES students, the median was calculate for each country, student above the median were defined as high SES while those below were defined as low SES. See Table 2 for the names of the variables used to define high and low SES in each assessment.

Non-response and small sample sizes: Indicator estimates were not reported for sub-populations if data for the sub-population was available for less than 90 percent of sampled students or if the number of observations for a particular sub-population was less than 100.

Standard errors and confidence intervals methodology
The suggested methodology for estimating standard errors and subsequent confidence intervals varies by assessment and aim to account for clustering at the school-level. All surveys suggest using replicate methods in which the sample variation is obtained from variously defined sub-samples that mimic the sample design; the variation in estimates among the replicates provides an estimate of the sampling variation. The suggested methods were used for all assessments except LLECE 2013. For this survey, replicate weights were provided with each of the learning achievement datasets; however, a large number of students in the background dataset (which included the responses to the bullying and home language questions) were not included in the student achievement dataset. In order to maximize the background data, a linearization method for estimating the standard errors...
robust to clustering at the school level was used. Table 3 describes the methodology used for each assessment.
<table>
<thead>
<tr>
<th>Assessment</th>
<th>Population</th>
<th>Question</th>
<th>Responses (mapping)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Grades 3 and 6</td>
<td>How would you characterize the area where your school is located?</td>
<td>In an area considered rural (rural) In an area considered urban (urban)</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grades 2 and 6</td>
<td>Your school is located in...</td>
<td>A town (urban) A suburb of a big city (urban) A big village (hundreds of homesteads) (rural) A small village (dozens of homesteads) (rural)</td>
</tr>
<tr>
<td>PISA 2015/2018</td>
<td>15 year-olds</td>
<td>Which of the following definitions best describes the community in which your school is located?</td>
<td>A village, hamlet or rural area (fewer than 3 000 people) (rural) A small town (3 000 to about 15 000 people) (rural) A town (15 000 to about 100 000 people) (urban) A city (100 000 to about 1 000 000 people) (urban) A large city (with over 1 000 000 people) (urban)</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>Grades 4 and 8</td>
<td>Which best describes the immediate area in which your school is located?</td>
<td>Urban—Densely populated (urban) Suburban—On fringe or outskirts of urban area (urban) Medium size city or large town (urban) Small town or village (urban) Remote rural (rural)</td>
</tr>
</tbody>
</table>
Table 2. Variables used to define high and low SES students

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Population</th>
<th>Variable</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLECE 2013</td>
<td>Grades 3 and 6</td>
<td>Index of the family’s socioeconomic status (isecf)</td>
<td>Parents</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grade 2</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Grade 6</td>
<td>Socioeconomic index of the student’s family (ses)</td>
<td>Students</td>
</tr>
<tr>
<td>PISA 2015/2018</td>
<td>15 year-olds</td>
<td>Index of economic, social and cultural status (escs)</td>
<td>Students</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>4th grade</td>
<td>Index of home resources for learning (asbghrl)</td>
<td>Students</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>8th grade</td>
<td>Index of home educational resources (bsbgher)</td>
<td>Students</td>
</tr>
<tr>
<td>Assessment</td>
<td>Method</td>
<td>Reference for formulas</td>
<td>Software routine</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------</td>
<td>------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>LLECE 2013</td>
<td>Linearized</td>
<td>StataCorp 2013</td>
<td>SVY module for Stata (StataCorp)</td>
</tr>
<tr>
<td></td>
<td>Jackknife</td>
<td></td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td>PASEC 2014</td>
<td>Jackknife repeated</td>
<td>PASEC 2017</td>
<td></td>
</tr>
<tr>
<td>PISA 2015/18</td>
<td>Balanced repeated</td>
<td>OECD 2009</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>Jackknife repeated</td>
<td>Foy &amp; LaRoche (2016)</td>
<td>PV module for Stata (Macdonald 2008)</td>
</tr>
</tbody>
</table>
References


