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 and Grade 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.

$$MPL_{t,n,s} = \frac{MP_{t,n,s}}{P_{t,n}}$$

where:

$MP_{t,n,s}$ = 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.

$P_{t,n}$ = 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).

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[1]
   iv. Population-based assessments[1]:
        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

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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[1] Proficient level is pending and subject to harmonization.

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 (end of primary or end of lower secondary education). 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 =
$$\text{Indicator } \textbf{4.1.2}_{t,n} \times \text{Indicator } \textbf{4.1.1}_{t,n,s}$$
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 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

Educational Level	Descriptor
Reading	
Grade 2	They read and comprehend most of written words, particularly familiar ones, and extract explicit information from sentences.
Grade 3	Students read aloud and comprehend many single written words, particularly familiar ones, and extract explicit information from sentences. They make simple inferences when longer texts are read aloud to them.
Grades 4 & 6	Students independently and fluently read simple, short narrative and expository texts. They locate explicitly-stated information. They interpret and give some explanations about the key ideas in these texts. They provide simple, personal opinions or judgements about the information, events and characters in a text.
Grades 7 & 10 Age 15	Students locate and connect multiple pieces of related information across sections of texts to understand key ideas. They make straightforward inferences when there is some competing information. They reflect and draw conclusions based on evidence, in a variety of text types.
Mathematics	
Grades 2	Students demonstrate skills in number sense and computation (with numbers less than 100), shape recognition and spatial orientation.
Grades 3	Students demonstrate skills in number sense and computation, shape recognition and spatial orientation.
Grades 4-6	Students demonstrate skills in number sense, computation, real world problems, basic measurement, 2D shape recognition, and reading and interpreting simple data displays.

Grades 7 & 10 Age 15	Students demonstrate skills in computation, solving problems in measurement and constructing a variety of data display, and making use of algebraic representations.

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 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). 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

An ideal program for reporting on SDG4.1.1 will have gone through three steps: Conceptual Framework, Methodological Framework, and a Reporting Framework. Each of these contains several complex sub-steps. For various levels and types of assessment, UIS had completed most of this work before accepting the responsibility of being custodian of reporting on SDG4.1.1. The Protocol for reporting Indicator 4.1.1 explains each of the activities and outputs help build the tools to generate a minimum level of consistency of education systems' reporting against Indicator 4.1.1, while retaining sufficient flexibility for education systems to pursue assessment programs appropriate to their context and needs.

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.

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 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.

Sex						
Assessment	**Definition**	**Metrics**	**Categories**	**Item and component description**	**Parity index (API)**	**Relevant link**
PISA	Sex of students	Nominal	2	Are you female or male?	Female Male	https://www.oecd.org/pisa/data/CY6_QST_MS_STQ_CBA_Final.pdf
PIRLS TIMSS	Sex of students	Nominal	2	Are you a girl or a boy?	Girls Boys	https://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_StuQ_4.pdfhttps://timssandpirls.bc.edu/pirls2016/questionnaires/downloads/P16_StuQ.pdf
LLECE	Sex of students	Nominal	2	¿Usted es niño o niña?	Niña Niño	https://unesdoc.unesco.org/ark:/48223/pf0000243533
PASEC	Sex of students	Nominal	2	Are you a girl or a boy?	Fille Garçon	http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf
SACMEQ	Sex of students	Nominal	2	What is your sex?	Female Male	http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf
PILNA AMPL SEA-PLM EGRA* EGMA* MICS6*	Sex of students	Nominal	2	Are you a girl or a boy?	Girls Boys	

Note (*): MICS 6, EGRA, EGMA: Proficient level is pending and subject to harmonization,

Location						
Assessment	**Definition**	**Metrics**	**Categories**	**Item and component description**	**Parity index (API)**	**Relevant link**
PILRS TIMSS	School location declared by the principal	Nominal	5	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	Remote rural Urban Densely populated	https://timssandpirls.bc.edu/pirls2016/questionnaires/downloads/P16_SchQ.pdf http://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_SchQ_4.pdf
PISA	School location declared by the principal	Nominal	5	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)	Rural area City	https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_SCQ_NoNotes_final.pdf
PASEC	School location declared by the principal	Nominal	4	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)	Un petit village Une ville	http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf

Location						
LLECE	School location declared by the principal	Nominal	5	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	Rural/urban	https://unesdoc.unesco.org/ark:/48223/pf0000243533
SACMEQ	School location declared by the principal	Nominal	5	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	Rural/Urban (city)	http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf; http://www.sacmeq.org/sites/default/files/sacmeq/reports/sacmeq-iii/working-documents/wd01_sacmeq_iii_results_pupil_achievement.pdf
EGMA* EGRA*	School location declared by the principal	Nominal	2	Is this considered an urban or a rural school? Urban, Rural		

Note: (*) EGRA, EGMA: Proficient level is pending and subject to harmonization,

Socio-Economic Status						
Assessment	**Definition**	**Metrics**	**Categories**	**Item and component description**	**Parity index (API)**	**Relevant link**
PISA	<u>Index of Economic, Social and Cultural Status (ESCS)</u> In PISA, a student's socio-economic status is estimated by the PISA 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.	Quartiles	Bottom quarter, Second quarter, Third quarter Top quarter	The ESCS is a composite score built by three components: the indicators parental education in years (PARED), Highest parental occupational status (HISEI), and home possessions (HOMEPOS) via a proxy measure for family wealth that includes (25 items): availability of country-specific household for example, such as a subscription to a daily newspaper, an MP3 player, Internet connection at home, the number of books at home, a computer or specific educational software.	Bottom quarter, Top quarter	Technical report PISA 2015 - Chapter 16: https://www.oecd.org/pisa/data/2015-technical-report/PISA2015_TechRep_Final.pdf Pisa Result 2018, volume II Chapter 2: http://www.oecd.org/publications/pisa-2018-results-volume-ii-b5fd1b8f-en.htm

Socio-Economic Status					
LLECE	<u>Indice de nivel socioeconómico de los estudiantes</u> 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 number of books available.	Quartiles	Low quarter, Second quarter, Third quarter, High quarter	¿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.	Low quarter/High quarter	Informe de resultados TERCE: Factores asociados. See: https://unesdoc.unesco.org/ark:/48223/pf0000243533

	Socio-Economic Status					
Assessment	**Definition**	**Metrics**	**Categories**	**Item and component description**	**Parity index (API)**	**Relevant link**
PASEC	Capital socioéconomique et culturel des familles L´Indice Capital socioéconomique et culturel des familles est construit à partir des réponses du questionnaire complémentaire détenu aux étudiants (résultats non disponibles)	Quintiles	1 quintile 2 quintile 3 quintile 4 quintile 5 quintile	Variables: Possession de biens matériels, caractéristiques de l'habitation, alphabétisme de la famille, utilisation de la langue d'enseignement et de(s) langue(s) de socialisation, indice socioéconomique	1 quintile/5 quintile	Cadre de référence des questionnaires contextuels, Voir: https://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf; Rapport PASEC 2014, voir: https://www.confemen.org/wp-content/uploads/2019/05/RapportPasec2014_FR_BD1.pdf
SAQMEC	Index of the Socioeconomic Status (SES) of pupils The SACMEQ Index of the socioeconomic status (SES) of pupils is derived from five elements that define the pupils' family environment	Quartiles	Low SES (25%) High SES (75%)	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.	Bottom quarter Top quarter	See: 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/research/Papers%20from%20the%202005%20International%20Invitational%20Educational%20Policy%20Research%20Conference/dolata.pdf

Immigration Status						
Assessment	**Definition**	**Metrics**	**Categories**	**Item and component description**	**Parity index (API)**	**Relevant link**
PIRLS TIMSS	Status declared by Students	Nominal	Country specific	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 od test) Younger than 3 years old, 3 to 5 years old, 6 to 7 years old, 8 years old or older.	No Yes (native born)	http://timssandpirls.bc.edu/timss2015/questionnaires/downloads/T15_StuQ_IntSc_8.pdf
PISA	Status declared by Students	Nominal	Country specific	In what country were you and your parents born? You, Mother and Father	Immigrant Non-immigrant	https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_STQ_NoNotes_final.pdf
ERCE	Status declared by Students	Nominal	Country specific	¿Naciste en este país? Si no naciste en este país ¿ qué edad tenías cuando llegaste?	Migrante No migrante	https://unesdoc.unesco.org/ark:/48223/pf0000243533
PIACC	Status declared by respondents	Nominal	Country specific	Were you born in (country) in what country were you born? At what age or in which year did you first immigrant to (country)?	Foreign-born/Native-born	https://www.oecd.org/skills/piaac/publications/PIAAC_Technical_Report_2019.pdf
PASEC	Le statut est directement reporté par les élèves avec l'appui de l'enquêteur	Nominal	Country specific	Were you born in (country) in what country were you born?	No Yes (native born)	http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf

Language of test at home

Assessment	Definition	Metrics	Categories	Item and component description	Parity index (API)	Relevant link
EGMA* EGRA*	The main language is declared by the student	Nominal	Country specific	Do you speak the same language at home as you speak at school?		
PASEC	The main language is declared by the student	Nominal	Country specific	Quelle langue parles-tu chez toi?		http://www.pasec.confemen.org/wp-content/uploads/2016/03/PASEC_2014_CADRE_REFERENCE_QUESTIONNAIRE_VF.pdf
PISA	The main language is declared by the student	Nominal	Country specific	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	https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_STQ_NoNotes_final.pdf
SACMEQ	The main language is declared by the student	Nominal	2	Do you speak English outside school? Yes/No		http://www.sacmeq.org/sites/default/files/sacmeq/training-modules/sacmeq-training-module-8.pdf
LLECE	The main language is declared by the student	Nominal	4	En tu casa ¿qué idioma hablan la mayor parte del tiempo? Castellano o portugués, lengua extranjera, lengua indígena, otra lengua	Habla lengua de la evaluación No habla lengua de la evaluación	https://unesdoc.unesco.org/ark:/48223/pf0000243533

Note: (*) EGRA, EGMA: Proficient level is pending and subject to harmonization,

ANNEX II

Acronyms

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

Assessments

AMPL	Assessments for Minimum Proficiency Levels
ASER	Annual Status of Education Report
EGRA	Early Grade Reading Assessment
EGMA	Early Grade Mathematics Assessment
ERCE	Regional Comparative and Explanatory Study
LLECE	El Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación
MICS	Multiple Indicator Cluster Surveys
PAL Network	People's Action for Learning Network
PASEC	Programme d'analyse des systèmes éducatifs de la Confemen
PIACC	Programme for the International Assessment of Adult Competencies
PILNA	Pacific Islands Literacy and Numeracy Assessment
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
PISA-D	Programme for International Student Assessment for Development
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Education Quality
SEA-MPL	Southeast Asia Primary Learning Metrics (SEA-PLM)
SEAMEO	Southeast Asian Ministers of Education Organization
TIMSS	Trends in International Mathematics and Science Study
UWEZO	(not an acronym)