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 though 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 students whose teachers have received in-service training in the past 12 to 24 months as reported in cross-national assessments (CNAs) and teacher surveys.

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
4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

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 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.

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).

**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.
4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

**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.
### 4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

<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. |

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*Updated February 2021*
### 4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

<table>
<thead>
<tr>
<th>Table 1. Data sources, target population, and questions on recent in-service training</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Observation visits to business premises, public organisations, non-governmental organisations</td>
</tr>
<tr>
<td>• In-service training courses in business premises, public organizations, non-governmental organisations</td>
</tr>
</tbody>
</table>

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-
### 4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

Table 1. Data sources, target population, and questions on recent in-service training

<table>
<thead>
<tr>
<th>Indicator data reported by UIS is taken from OECD, TALIS 2018 Database, Table I.5.1.</th>
</tr>
</thead>
</table>
| **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 |
4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

Table 1. Data sources, target population, and questions on recent in-service training

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<th>Questions on recent in-service training</th>
</tr>
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</table>
| TIMSS 2015   | Teachers of 4th grade students; teachers of 8th 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  

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  

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.
4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

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
4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

robust to clustering at the school level was used. Table 3 describes the methodology used for each assessment.
4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

Table 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)&lt;br&gt;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)&lt;br&gt;A suburb of a big city (urban)&lt;br&gt;A big village (hundreds of homesteads) (rural)&lt;br&gt;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)&lt;br&gt;A small town (3 000 to about 15 000 people) (rural)&lt;br&gt;A town (15 000 to about 100 000 people) (urban)&lt;br&gt;A city (100 000 to about 1 000 000 people) (urban)&lt;br&gt;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)&lt;br&gt;Suburban–On fringe or outskirts of urban area (urban)&lt;br&gt;Medium size city or large town (urban)&lt;br&gt;Small town or village (urban)&lt;br&gt;Remote rural (rural)</td>
</tr>
</tbody>
</table>
### 4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

**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 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>
## 4.c.7 Percentage of teachers who received in-service training in the last 12 months by type of training

<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 replication</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>Balanced replication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PISA 2018</td>
<td>Balanced repeated</td>
<td>OECD 2009</td>
<td>PV module for Stata (Macdonald 2008)</td>
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<td></td>
</tr>
<tr>
<td>TIMSS 2015</td>
<td>Jackknife repeated</td>
<td>Foy &amp; LaRoche (2016)</td>
<td></td>
</tr>
</tbody>
</table>
References


