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UNESCO Institute for Lifelong Learning

Monitoring adult literacy for Indicator 4.6.1

Literacy Core Group tentative recommendations for the Global Alliance to Monitor Learning (GAML5)

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1 Executive Summary

1.1 Overview

The current paper presents the discussions and recommendations of the Core Literacy Expert Group on global content/competency and reporting framework for SDG Indicator 4.6.1 with a particular focus on literacy. SDG Indicator 4.6.1 is defined as, "Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy, by sex".

1.2 Outline

The first part of the paper provides the background and rationale for the work undertaken. This is followed by a section on the global content framework for literacy. This section provides information on the evolution of a definition of literacy and proposes a working definition for indicator 4.6.1. It further discusses approaches to the expansion of the PIAAC framework to the lower end of literacy skills and proposes the content areas to be measured within literacy. The paper then presents a tentative reporting scale and proposed minimum fixed proficiency levels on literacy for UIS reporting. Finally, the paper briefly shares options for assessment methodologies.

The paper also includes appendices which provide background information for the proposals put forth in the paper.

The paper contains the following key recommendations for discussion, review and agreement:

Recommendation 1: To use the UNESCO working definition for literacy (2005) for indicator 4.6.1, which is "*Literacy is the ability to identify, understand, interpret, communicate and compute, using printed and written materials associated with varying contexts. It involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society*" (UNESCO, 2005, p. 13)

Recommendation 2: To use reading as the domain for literacy measurement and reporting.

Recommendation 3: To adopt the PIAAC (Programme for the International Assessment of Adult Competencies) assessment framework but to extend the current PIAAC Level 1 into equidistant levels, taking a hybrid approach involving reading components and low-rung items.

Recommendation 4: To use a reporting scale with five levels (A to E) defined in an equidistant manner.

Recommendation 5: To use two fixed minimum proficiency levels for literacy skills on the suggested reporting scale:

- Level B: Proposed fixed minimum proficiency level for low-income and lower-middle-income countries (Sentence Literacy Level, or proposed Level B, with skills below PIAAC Level 1);
- Level C: Proposed fixed minimum proficiency level for upper-middle income and high-income countries (Early Functional Literacy Level, or proposed Level C, with skills equivalent to PIAAC Level 1).

Recommendation 6: To address the issue of limited data coverage through direct measures of literacy, using **two strategies**.

1. As an interim strategy, or Option 1, develop a sentence processing test or a simple sentence test;
2. As a long-term strategy, Option 2, develop a short literacy assessment module.

2 Introduction

The Sustainable Development Goal (SDG) Target 4.6 states that "By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy." The global indicator of this target is SDG Indicator 4.6.1, which is defined as "Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy, by sex".

While several national and cross-national measures focusing on adult literacy exist, the global indicator 4.6.1 poses new challenges. For global measurement, monitoring and reporting purposes, there is a need for an agreement on a fixed proficiency level: "the fixed level of proficiency is the benchmark of basic knowledge in a domain (literacy or numeracy) measured through learning assessments" (UIS, 2017).

Measuring, reporting and monitoring progress towards SDG Target 4.6 poses challenges due to three reasons. First, currently, the majority of countries do not use a direct measure of literacy. Second, the comparability of the existing measures of literacy and numeracy used across countries may be challenging because of the diverse measures, different definitions of literacy/numeracy, and varying assessment instruments. Third, although several robust cross-national assessments (e.g. the Literacy Assessment and Monitoring Programme [LAMP], the Programme for the International Assessment of Adult Competencies [PIAAC], and Skills Towards Employment Productivity [STEP]) are available for high- and upper-middle income countries, they are currently financially and operationally challenging for lower-middle- and low-income countries.

To elaborate further, dedicated national adult literacy and numeracy assessments exist. For instance, the Kenya National Adult Literacy Assessment (KNALS) and the Bangladesh Adult Literacy Assessment (BALS) are examples of efforts made by these countries to directly measure literacy levels of their populations. However, as one could anticipate here, national assessments have been undertaken by a relatively small number of countries. They are also often based on country-specific conceptual and assessment frameworks that make comparisons of results with other surveys extremely difficult. In addition, the variation in the conditions under which literacy assessment studies are implemented (e.g. sampling, response rates, quality control) also have an impact on comparability. Meanwhile, the cost and complexity of existing large-scale assessments such as PIAAC, LAMP and STEP make it unlikely that more than a small number of low- and middle-income countries will participate in these programmes. This situation is not likely to change in the foreseeable future.

Unlike the case of low adoption rates of existing cross-national measurements and slow progress in the development of national assessment instruments in adult literacy and numeracy, in recent years, several regional school-based measurement instruments have been developed and administered in Africa and Latin America. For instance, the *Programme d'Analyse des Systèmes Educatifs de la CONFEMEN* (PASEC), the Third Regional Comparative and Explanatory Study (TERCE) and the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), supported by UNESCO institutions, have gained popularity as highly valued assessment instruments in Northern Africa, Latin America and South and Western Africa. Moreover, there are further developments of cross-national

assessment instruments like the Programme for International Student Assessment (PISA), PISA for Development (P4D) or Trends in International Mathematics and Science Study (TIMSS) developed by the Organisation of Economic Cooperation and Development (OECD) and the International Association for the Evaluation of Educational Achievement (IEA) to bridge the gap in data generation on learning outcomes in many countries. Despite these developments focusing on school-based children and youth and their learning outcomes, the experiences generated from this process could be a major source of inspiration and knowledge to advocate for and develop robust and quality measurement instruments in youth and adult literacy and numeracy.

To advance the work on the measurement strategy for indicator 4.6.1, two expert meetings have been conducted, one in November 2017 and the second in May 2018 by the UNESCO Institute of Lifelong Learning (UIL). These meetings were part of the Global Alliance to Monitor Learning (GAML) initiative led by the UNESCO Institute for Statistics (UIS) which was followed by the establishment of two expert groups, one for literacy and another for numeracy.

While a separate paper is being produced to present the recommendations pertaining to the measurement and reporting on adult numeracy, the current paper presents the proposals for literacy which were put forward by the Core Literacy Expert Group. The paper is organised into four parts. Section 2 presents the proposals for the global content framework for literacy by starting with the definitions of literacy and the decisions on measuring and reporting on reading as a domain for literacy. Section 3 proposes a UIS reporting scale for SDG 4.6.1, including a proposal on the extension of the PIAAC framework to include the lower levels of skills distribution and a UIS reporting scale for literacy. Section 4 discusses options for assessment methodologies.

3 Global Content Framework for Literacy

Defining literacy

Definitions and concepts of literacy have evolved over time. Importantly, they have moved from focusing on the capacity to read and write a simple sentence (UNESCO, 1958 and 1978) to a much broader understanding.

As spelled out in the SDG4-Education 2030 Framework for Action, literacy involves a learning continuum comprising different proficiency levels. This notion moves away from a dichotomous approach of literate/illiterate towards a more nuanced and context-sensitive approach linked to learning throughout life. This is one of the most significant developments with regard to how literacy is conceptualized, and it implies that literacy can no longer be treated as a stand-alone set of skills developed and completed within a short timeframe, but rather as a component of a set of core competencies – usually part of basic education – that require continuous updating, throughout life.

UNESCO's working definition of 2005 defines literacy as "*the ability to identify, understand, interpret, communicate and compute, using printed and written materials associated with varying contexts. It involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community*

and wider society" (UNESCO, 2005, p. 13). This definition marks the shift from a dichotomous measurement of literacy to a focus of viewing literacy as a continuum.

Previous and existing large-scale international or national assessments such as the International Adult Literacy Survey (IALS), the Adult Literacy and Life Skills Survey (ALL), PIAAC and STEP have used similar definitions. For example the Bangladesh Literacy Assessment Survey (BLAS) defines literacy as "the ability to read, understand, interpret, communicate and compute in verbal and written forms in varying contexts" (BBS, p. 3, 2011).

Recommendation 1: Based on outcomes of the first expert meeting in November 2017, it is recommended to use **the UNESCO working definition of literacy (2005) for indicator 4.6.1**, which is "*Literacy is the ability to identify, understand, interpret, communicate and compute, using printed and written materials associated with varying contexts. It involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society*" (UNESCO, 2005, p. 13).

3.1 Domains for Literacy Assessment

A discussion was held in the expert meeting as to what domains should be covered by the literacy component of 4.6.1. Reading was proposed to be the domain for measurement and reporting.

It was also recognized that writing is referred to as an integral part of adult literacy skills across various definitions of literacy, especially in our increasingly digitalized world. However, it was generally agreed that writing is more difficult to measure and assess than reading and requires more training and complex operation in scoring and more complex modelling in scaling than reading. Writing could, however, be part of national surveys as indicated in several examples (e.g. the Level One Study in Germany; the Korean Literacy Assessment; the Everyday Life Survey in France). There was a broadly shared sense, however, that global writing assessment with cross-country comparability would not be recommended, due, for instance, to linguistic comparability, and different levels of transparency in orthography.

Recommendation 2: To use reading as the domain for literacy measurement and reporting for indicator 4.6.1.

3.2 Extension of the PIAAC framework

A major challenge to adopt the PIAAC conceptual framework was related to the fact that participating countries of PIAAC or STEP are either high- or upper-middle-income countries. Given the skills distribution patterns indicated by the PIAAC and STEP datasets, a large percentage of the adult population in participating middle-income countries exhibit relatively low levels of literacy proficiency. An educated guess is that adults with low literacy skills may constitute the majority of the adult population in lower-middle- and low-income countries. This indicates a need to devote much more attention to the lower end of the skills distribution, and thus a need to review existing and/or developing new assessment modules to cover this part of the skills distribution.

Although PIAAC/STEP has a reading components test designed to assess the basic knowledge and skills required for effective reading comprehension, and a core literacy assessment consisting of eight items to distinguish whether respondents have reached a minimum level

of proficiency, two issues remain. First, the item pools are confidential. Second, and perhaps more importantly, test items in the PIAAC core literacy assessment were largely drawn from earlier large-scale assessment test pools (IALS/ALL), which lack a sufficient amount of items towards assessing skills at the lower end of the distribution.

To tackle the challenges set out above, UIS and UIL invited several experts to examine different approaches in assessing lower literacy skills and propose different options for the expansion of the PIAAC framework for literacy. To do so, several national assessments were reviewed and a range of literature was consulted. The discussions led to the elaboration on two approaches which were in use to establish agreement on what is measured for literacy. Below, these two approaches are further discussed.

Recommendation 3: To adopt the PIAAC assessment framework but to extend the current PIAAC Level 1 into equidistant levels, taking a hybrid approach involving reading components and low-rung items.

This is based on the review and discussions on the conceptual frameworks of past and existing cross-national literacy assessment surveys.

3.2.1 Approach 1: Reading components approach

Some existing assessments of reading components, underpinned by the above-mentioned model of learning to read (e.g. Frith, 1985) have been developed. The International Survey of Reading Skills (ISRS), which was implemented in 2005 in Canada and the US, developed a reading component with the aim to assess the component reading skills presumed to underlie the emergence of fluid and automatic reading. These components include (1) *receptive (oral) vocabulary*, (2) *real-word reading for accuracy and speed*, (3) *pseudo-word reading for accuracy and speed*, (4) *spelling*, (5) *rapid naming of letters*, and (6) *short-term working memo*ry (Strucker, Yamamoto and Kirsch, 2005).

Administered on a group of 950 adult learners, the reading components test results indicate that gaps in mastering these skills sharply differentiate learners with varying learning needs. In particular, skills in areas of *decoding*, *word recognition* and *word meaning (vocabulary)*, separate adults in Level 2 from Level 3 on the ISRS proficiency scale, with the latter group reporting higher income and less unemployment, increased access to lifelong learning and greater amounts of personal reading for pleasure, and increased civic participation.

Despite the virtues of this approach, challenges exist in developing a set of reading components that can be compared across languages. This is because decoding/word recognition components are highly dependent on the precise nature of each language and its writing system. Aspects that affect difficulty in development of learner proficiency include whether the writing system is alphabetic, syllabic, logographic, or some combination of these; the degree of regularity of the relationship between the print and oral language forms; and how morphological and grammatical/syntactical features of the language are encoded in words. It is thus difficult to ensure cross-language comparability, as this requires evaluating how to match the sources of difficulty in acquiring these print-related literacy skills for each language, and balancing them across stimuli and tasks (Sabatini and Bruce, 2009).

Precisely out of these concerns, and as a commitment to strengthening national capacities, LAMP allowed each participating country to develop a set of component measures which are

unique to its language, script and culture based on the guidelines provided by UIS. LAMP's reading component module contains the following six items (UNESCO-UIS, 2009):

1) Alphanumeric recognition;
2) Visual word recognition;
3) Word meaning (vocabulary);
4) Sentence processing; and
5) Passage reading.

This reading component module assumes that adults surveyed will have basic oral vocabulary, syntactic/grammatical and listening comprehension skills in the target language. Each country will decide on the language or languages to be used to test the literacy levels of its population. Validity of the instruments at the national and international levels will be established by linking the assessment of skills in each domain to a theory that explains a significant proportion of the observed variance in both item difficulty and individual proficiency.

A reading components module is included as an optional subdomain under the domain of literacy in PIAAC as administered by the OECD. In addition to global comparability concerns, the reasonable assumption that the majority of the adult population in OECD member countries has a basic command of the grammar and syntax of the language led to an adjustment of the above-mentioned modules of reading components for the first PIAAC Cycle. The battery of reading components used in PIAAC Cycle 1 as well as in STEP include three out of the six LAMP reading components. These are (1) print vocabulary, (2) sentence processing, and (3) passage fluency.

3.2.2 Approach 2: Lower-rungs approach

Alternatively, a "lower-rungs" approach towards assessing the lower parts of literacy skills has been adopted by some existing surveys. The expression *lower rungs of the ladder* is used as a metaphor to better describe literacy by splitting Level 1 of the first large-scale literacy assessment, IALS, into smaller proficiency levels (Brooks, Davies, Duckett, Hutchison, Kendall and Wilkin, 2001). The Progress of Adult Literacy study in UK and the Level One Study (LEO) in Germany followed this strategy in developing test items to better understand the lower regions of the overall literacy scale.

There are a number of other national surveys that have developed their own scales for assessing low levels of literacy, including the Information and Everyday Life Survey (IVQ) in France, the Kenyan National Adult Literacy Survey (KNALS), and the Bangladesh Literacy Survey (BLS).

3.2.3 Commonalities of the two approaches

Classical theories of literacy acquisition of children and adults inform the definition and test development of the above-mentioned tests. For instance, Frith's (1985) classic model of reading acquisition underpins a reading components approach towards assessing literacy skills. This model distinguishes three main learning stages, each corresponding to the acquisition of logographic, alphabetic and orthographic skills. Although the three stages are not as rigidly partitioned as this simplified theoretical model suggests, research in

neurocognition and education indicates that word recognition and decoding skills are necessary to enable the growth in proficiency of meaning/comprehension level skills (e.g. Dehaene, 2009; Perfetti, 1986; Share, 2008).

Valid easy test items are hard to develop because test-takers could rely on prior knowledge or common sense to provide correct answers rather than an understanding of the test question. LEO test items were developed taking into consideration common *coping strategies* of struggling readers as suggested by earlier empirical work (Nienkemper, 2015). Such considerations were also taken into account in the background questionnaire to IVQ in France.

Although these two approaches towards understanding literacy proficiencies at the lower end were previously acknowledged to be distinct from each other, a recent working paper challenges this view by analysing the PIAAC reading components data among participants in Germany (Nienkemper, Grotlüschen and Euringer, 2016). Findings suggest that three reading components (*print vocabulary, sentence processing and passage fluency*) in PIAAC to a large extent fit a unidimensional Item Response Theory (IRT) model. Moreover, this paper shows that the difficulty levels of sentence processing items are on a par with passage fluency in differentiating respondents with varying levels of proficiency.

Table 1 below presents two proposed additional levels (A and B) to extend the existing PIAAC framework (Level C) at the lower end. These are based on existing work from various surveys consisting of measurements of the lower end of literacy skills, including SACMEQ and PASEC in Africa, Progress in Adult Literacy and Skills for Life in UK and Level One Study (LEO) in Germany in particular, and empirical analyses of the components versus the lower-rungs approach. The level descriptors are still a work in progress, and are being developed on the basis of resources regarding very low-level literacy skills of adults in some of the above-mentioned surveys, such as LEO and the Progress in Adult Literacy and Skills for Life in UK.

Table 1: Proposed extension levels (Levels A and B) to PIAAC (Level C)

Level C: Early Functional Literacy Level Skills related to PIAAC Level 1 (from PIAAC Level 1 descriptor) 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 into a document. Little, if any, competing information is present. Some tasks may require simple cycling through more than one piece of information. Knowledge and skills in recognizing basic vocabulary determining the meaning of sentences, and reading paragraphs of text, is expected.
Level B: Sentence Literacy Level (Proposed extension) Skills related to PIAAC below Level 1 Individuals at this level (adapted from PIAAC below Level 1 descriptor) • can read brief texts on familiar topics; • can locate a single piece of specific information identical in form to information in the question or directive; and • are not required to understand the structure of sentences or paragraphs and only need to demonstrate basic vocabulary knowledge.

Text characteristics: Text at this level consists of 1–2 sentences, roughly about 5–9 words. Sentences follow a simple subject–verb–object (SVO) structure without any subordinate clause. Familiar topics are presented in the text with frequently used words, excluding any foreign or technical words. Tasks at this level do not make use of any features specific to digital texts.
Level A: Pre-Literacy Level (Proposed extension) Individuals at this level can • match a given word from a question in another text (less than one page) with helpful layout like headlines, bulleted lists, bold print, etc.; • recognize their own name and address; and • recognize familiar brands or signs logographically (stop, pull/push, brands).

4 Proposed reporting scale and fixed proficiency level

4.1 Proposed reporting scale (full scale)

Table 2 proposes an extension of the PIAAC reporting framework downwards (See Table 1 for extended level descriptors), with five levels (A to E) defined in an equidistant manner, following the common practice in existing surveys. The lowest level covers a score range between 75 and 125 (on a 0 to 500 score range). Individuals at this level can only recognize their own names and addresses, or familiar brands or signs (see Table 1 for a detailed description of tasks at this level). The second-lowest level corresponds to a score range between 126 and 175, with corresponding tasks at the sentence level (1 to 2 sentences). Aiming to ease communication of a reporting scale to policy makers, the Literacy Expert Group suggested names for each reporting level: A. Pre-literacy level, B. Sentence literacy level, C. Early functional literacy level, D. Full functional literacy level, E. Adequate literacy level. The naming of these proficiency levels requires further discussions to reflect countries' perspectives.

Table 2: A tentative reporting scheme for literacy

Level	Description/difficulty level	Comments
E	**Adequate Literacy Level** Skills related to PIAAC *lower* 'Level 3 (276–325 score range)	'Adequate' level
D	**Full Functional Literacy Level** Skills related to PIAAC Level 2 (226–275 score range)	
C	Early Functional Literacy Level Skills related to PIAAC Level 1 (176–225 score range)	Minimal ("Fixed") level for reporting for high- and upper-middle-income countries

B	**Sentence Literacy Level** (126–175 score range) ⇐	**Minimal ("Fixed") level for reporting for low-income countries**
A	**Pre-Literacy Level** (75–125 score range)	

Recommendation 4: To use a reporting scale with five levels (A to E) defined in an equidistant manner.

4.2 Fixed proficiency level: Challenges and proposals

The global indicator 4.6.1 is defined as the "*Percentage 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*". Given UNESCO's definition of viewing literacy as a continuum from low to high levels, the indicator could indeed be fixed at any level of the proficiency continuum given the cultural, societal, economic and policy needs of Member States.

There are different approaches to establish fixed proficiency levels for reporting. One such approach is to allow countries to make a decision on the fixed proficiency level according to their own policy needs. For instance, the sixteen participating countries in SACMEQ can independently decide what minimum proficiency level each country wishes to achieve over time. Another approach suggests that concrete benchmarks for improvement should be established to monitor progress over time, e.g., to decrease the at-risk population by 10 percent until the next cycle of assessment. These approaches could be considered and applicable for reporting the progress on indicator 4.6.1.

The analysis of the data from PIAAC and STEP, shown in the Table in Annex 3, provides the most recent distribution of literacy proficiencies in 42 countries that have participated in either PIAAC or STEP. As noted earlier, the majority are high- or upper-middle-income countries, and as indicated in Annex 3, there is a distinct pattern between countries' income category and literacy skills proficiency distributions. For high-income countries, roughly around 80% of the population reach PIAAC proficiency level 2 or above. However, for *upper-middle*-income countries such as Colombia and Turkey, the combined percentages of youth and adults in the categories of PIAAC Level 1 and Below Level 1 are 35% and 45%; and this figure rises sharply to over 60% for Jakarta (Indonesia) and Kenya, both lower-middle-income countries. So, an educated guess is that these figures are likely to be even higher for low-income countries with poorer educational quality and higher school dropout rates. The statistics in Annex 3 imply that *the chosen "fixed minimum proficiency level" has to be no higher than the skills subsumed in PIAAC Level 1*.

The above evidence suggests that a single fixed level for global reporting could lead to a majority of countries having a majority of their adult population classified as being below the minimum literacy proficiency level. Hence, an income-based reporting strategy is recommended by the Literacy Expert Group. This strategy uses the classification of countries into different income groups as suggested by the World Bank: low, lower-middle-, upper-middle-, and high-income countries.

Recommendation 5: To use two fixed minimum proficiency levels for literacy skills on the suggested reporting scale:

- Level B: Proposed fixed minimum proficiency level for low-income and lower-middle-income countries (Sentence Literacy Level, or proposed Level B, with skill below PIAAC Level 1);
- Level C: Proposed fixed minimum proficiency level for upper-middle income and high-income countries (Early Functional Literacy Level, or proposed Level C, with skills equivalent to PIAAC Level 1).

5 Options for assessment methodologies

To address the issue of limited data coverage through direct measures of literacy, the following two options were discussed by the literacy core group:

Option 1 Interim strategy: A sentence processing test: This option is recommended to Member States to enable them to report on a minimum fixed proficiency level as an interim solution.

Given time and/or budget constraints, focusing on a *fixed level of proficiency* should be prioritized as an interim strategy, although it goes against the notion of understanding literacy as a continuum of skills. Experts agreed that *simple sentence (sentence processing)* could be used as an interim strategy for assessing low literacy skills, provided this could be linked with an overarching literacy scale. Empirical evidence indicates that among the three PIAAC reading components, *sentence processing* has as strong a discriminating power as *passage fluency* (Nienkemper et al., 2016). The experts are aware that the meaning of any literacy proficiency level based upon simple sentences and subsequently used in reporting will vary by language. This is due to the fact that languages differ in terms of the relationship of their written form to their spoken form, in orthographic structure, and features that influence the relative difficulty of the act of decoding the printed word.

Option 2 Long-term strategy: A short literacy assessment module: A short literacy assessment module with the aim of collecting enriched data to better inform policy making and enabling global comparability is highly recommended.

Based on the existing work from various surveys consisting of measurements of the lower end of literacy skills, including SACMEQ and PASEC in Africa, Progress in Adult Literacy and Skills for Life in UK and Level One Study in Germany in particular, and empirical analyses of the components versus the lower-rungs approach, a proposal of expanding and extending the current PIAAC Level 1 and Below Level 1 into **equidistant** levels is made by the Literacy Expert Group. The extension takes a hybrid approach involving reading components and lower-rung items, and tasks will be at word or sentence level.

Recommendation 6: To address the issue of limited data coverage through direct measures of literacy, using two strategies.

1. As an interim strategy, or Option 1, develop a sentence processing test or a simple sentence test
2. As a long-term strategy, Option 2, develop a short literacy assessment module.

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7 Annexes

7.1 Annex 1: A survey of existing national literacy assessments

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
Bangladesh	Literacy Assessment Survey (LAS)	Government	Single country	11-45 aged	direct interview and literacy assessment test on a household basis	reading, writing, numeracy, communication, and comprehension	2011. Nov	Literacy (UNESCO)	Bangladesh Bureau of Statistics. (2013). Literacy Assessment Survey (LAS) 2011. Retrieved from http://203.112.218.66/WebTestApplication/userfiles/Image/Latest%20Statistics%20Release/LAS_2011.pdf	Bangladesh Bureau of Statistics. (2013). Literacy Assessment Survey (LAS) 2011. Retrieved from http://203.112.218.66/WebTestApplication/userfiles/Image/Latest%20Statistics%20Release/LAS_2011.pdf
Bangladesh	Education Watch 2016	Civil society Campaign for Popular Education (CAMPE)	Single country	11 aged above	oral and written assessment test	reading, writing, numeracy, and application of 3R's	2016	Literacy refers to "possession of skills in reading, writing and numeracy related to familiar contents and contexts and the ability to use these skills in everyday life in order to function effectively in society" (Education Watch, 2016, p. 6).	Campaign for Popular Education (CAMPE). (2016). Education Watch 2016. Literacy, skills, lifelong learning. SDG4 in Bangladesh: Where Are We. (2016). Retrieved from http://www.campebd.org/page/Generic/0/6/18	Campaign for Popular Education (CAMPE). (2016). Education Watch 2016. Literacy, skills, lifelong learning. SDG4 in Bangladesh: Where Are We. (2016). Retrieved from http://www.campebd.org/page/Generic/0/6/18
Botswana	National literacy survey	Ministry of Education and Skills Development	Single country	10-70 aged	household and individual questionnaires, interviews, and direct assessment of literacy competency skills	document literacy, prose literacy, and quantitative literacy	2014	Literacy (UNESCO, OECD), Numeracy (OECD)	PIAAC literacy framework http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=edu/wkp(2009)13 PIAAC numeracy framework http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP(2009)14&doclanguage=en	Statistics Botswana. (2016). National literacy survey 2014. Retrieved from http://www.statsbots.org.bw/sites/default/files/Literacy Survey 2014 2.pdf

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
Canada	Selected Assessment Tools	Ontario Ministry of Training, Colleges, and Universities	Single country	16-65 aged	Literacy programme-based assessment	skills, tasks, practices and changes in learner's lives	2011-current	Literacy is understood as combination of "skills, tasks, practices, and changes in learners' lives" (OALCF, 2011, p. 3). "Skills are discrete descriptors of literacy and numeracy development, such as decoding, sentence structure, and locating information" (OALCF, 2011, p. 3). Practises: "understanding literacy and numeracy as a social practise involves consideration of what people are doing, feeling, and thinking when engaged with actual print and numeracy activities" (OALCF, 2011, p. 3). "Tasks emphasize more than skills, as they consider purpose, context, and culture to reflect actual use" (OALCF, 2011, p. 3). Change: "people respond to change and make changes in their lives and the lives of others when they participate in a literacy programme" (OALCF, 2011, p. 3).	Ontario Ministry of Training, Colleges and Universities. (2011). Selected Assessment Tools. Retrieved from http://www.tcu.gov.on.ca/eng/eopg/publications/OALCF_Selected_Assessment_Tools_Mar_11.pdf	Ontario Ministry of Training, Colleges and Universities. (2011). Selected Assessment Tools. Retrieved from http://www.tcu.gov.on.ca/eng/eopg/publications/OALCF_Selected_Assessment_Tools_Mar_11.pdf
Canada	Test of Workplace Essential Skills	National Literacy Secretariat, Human Resources Development Canada.	Single country	16-65 aged	Different types of assessment (general series, sector series, web-based, domain-specific, custom and complmentary tools)	reading text, document use, and numeracy	2009-current	Essential skills are not technical skills but rather skills people use to carry out a wide variety of occupational tasks and daily activities	http://www.towes.com/media/7478/towes%20sample%20booklet.pdf	TOWES. (n.d.). What is TOWES. Retrieved from http://www.towes.com/en/about-towes/about-us
Cambodia	Assessing the Functional Literacy Levels of the Population in Cambodia	Ministry of Education, Youth and Sports, UNDP, UNESCO Cambodia, and the UNESCO Principal Regional	Single country	15 aged above	Stratified random samling and multi-stage cluster sampling for household national survey	reading, writing, numeracy and life skills	1999	Literate: A person aged 15 years or over whom can, with understanding both read and write, a short, simple statement about every life. Functional literacy is a matter of growing concern in a world where technological progress demands ever higher level of skills. Special measures are required to deal with	Report on the assessment of the functional literacy levels of the adult population in Cambodia. Retrieved from http://www.unesco.org/ulis/cgi-bin/ulis.pl?catno=150517&set=005A1D3F31_0_173&gp=1&lin=1&ll=1	Report on the assessment of the functional literacy levels of the adult population in Cambodia. Retrieved from http://www.unesco.org/ulis/cgi-bin/ulis.pl?catno=150517&set=005A1D3F31_0_173&gp=1&lin=1&ll=1

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
		Office for Asia and the Pacific (PROAP)						this problem, which also depends on skills learned outside the school-informal education.		
England and Wales	The Progress in Adult Literacy study	Basic Skills Agency	2 countries	18-80+ aged	Reading & writing tests administered individually to learners in adult literacy classes	literacy	1998-99	Ability to tackle the reading and writing tests	Brooks, G., Davies, R., Duckett, L., Hutchison, D., Kendall, S. and Wilkin, A. (2001). *Progress in Adult Literacy: Do Learners Learn?* London: Basic Skills Agency. https://eric.ed.gov/?id=ED457365	Brooks, G., Davies, R., Duckett, L., Hutchison, D., Kendall, S. and Wilkin, A. (2001). *Progress in Adult Literacy: Do Learners Learn?* London: Basic Skills Agency. https://eric.ed.gov/?id=ED457365
England	The Skills for Life 2011 Survey	Department for Business, Innovation and Skills	Single country	16-65 aged	Household and individual questionnaire, Computerized assessments (25 min) and follow-up face-to-face interviews	literacy, numeracy, and ICT	May 2010-Feb 2011	Literacy, Numeracy and ICT skills (OECD)	Department for Business, Innovation and Skills. (2012). The 2011 Skills for Life Survey: a Survey of Literacy, Numeracy, and ICT Levels in England. BIS Research paper	Department for Business, Innovation and Skills. (2012). The 2011 Skills for Life Survey: a Survey of Literacy, Numeracy, and ICT Levels in England. BIS Research paper
France	The Information and Everyday Life Survey (IVQ)	The National Institute for Statistics and Economic Studies (INSEE)	Single country	16-65 aged	household survey and individual literacy assessment.	literacy (reading and writing) and numeracy skills	2004, 2005, 2007, 2009, 2011, 2013.	"Illiteracy describes the situation with respect to the written word of individuals who, having attended school in French, are unable, by themselves and using only the written word, to effectively understand a text dealing with everyday situations, and/or cannot effectively communicate a message in writing." (Jeantheau, 2015, p. 2).	Jeantheau, J.P. (2015). Everyday Life Survey (IVQ) in France: more than a national survey. Retrieved from https://ec.europa.eu/epale/en/resource-centre/content/everyday-life-survey-ivq-france-more-national-survey-more-basis-indicators	Jeantheau, J.P. (2015). Everyday Life Survey (IVQ) in France: more than a national survey. Retrieved from https://ec.europa.eu/epale/en/resource-centre/content/everyday-life-survey-ivq-france-more-national-survey-more-basis-indicators
Germany	Level One Study (LEO)	Bundesministerium für Bildung und Forschung (BMBF).	Single country	18 - 64 aged	computer-assisted personal interviews.	reading and writing skills	2010	“Functional illiteracy exists when the written skills of adults are lower than those which are the minimum and considered a matter of course to cope with day-to-day requirements in society. ... If a person cannot read one or several items of information directly contained in a simple text so that the sense is understood and/or is at a similar skills level when	Grotlüschen, A., & Riekmann, W. (2011). LEO. - Level-One Studies. Press brochure. Retrieved from http://blogs.epb.uni-hamburg.de/leo/files/2011/12/leo-Press-brochure15-12-2011.pdf	LEO. (n.d.). LEO – Level-One Studies. Retrieved from http://blogs.epb.uni-hamburg.de/leo/?p=657

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
								writing" (Grotlüschen & Riekmann, 2011, p. 13).		
India	National Literacy Mission.	Government of India.	Single country	persons aged 15 and above.	written summative test (3 hours).	reading, writing, and numeracy	twice a year (6th March and 20th August).	"The National Literacy Mission defines literacy as acquiring the skills of reading, writing and arithmetic and the ability to apply them to one's day-to-day life" (NLM, n.d. para. 6).	National Literacy Mission. (n.d.). United Nations Education Scientific and Cultural Organisation (UNESCO). Retrieved from http://www.nlm.nic.in/unesco_nlm.htm	National Literacy Mission. (n.d.). National Literacy Mission – India. Retrieved from http://www.nlm.nic.in/welcome.html

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
Kenya	The Kenya National Adult Literacy Survey (KNALS).	Government of Kenya (GoK), Department for International Development (DFID), Canadian International Development Agency (CIDA) and UNESCO.	Single country	people aged 15 and above.	four questionnaires (households, individuals, institutions providing literacy, and literacy (assessment) tests). The surveys were conducted in English, Kiswahili and 18 other local languages. Self-reporting and actual testing were utilised.	reading, writing and computation (numeracy).	June – August 2006.	Literacy is understood as "a set of tangible skills particularly cognitive skills of reading and writing that are independent of the context in which they are acquired and the background of the people who acquire them" (Kenya National Bureau of Statistics, 2007, p.17) "Narrative prose - considered as continuous text that aims to tell a story whether fact or fiction" (Kenya National Bureau of Statistics, 2007, p.17) "Expository prose - considered as continuous text that aims to describe, explain, or otherwise convey factual information or opinion to the reader" (Kenya National Bureau of Statistics, 2007, p.17) "Documents - considered as structured information organised in such a way that the reader is required to search, locate, and process selected facts rather than read every word of a continuous text" (Kenya National Bureau of Statistics, 2007, p.19-20) "Numeracy is the knowledge and skills required to effectively compute and respond to demands of diverse situations. This involves solving problems in daily life, work, and interpreting graphs, tables and diagrams" (Kenya National Bureau of Statistics, 2007, p.20)	Kenya National Bureau of Statistics. (2007). Kenya National Adult Literacy Survey report. Nairobi.	Kebathi, J.N. (n.d.). Measuring Literacy: The Kenya National Adult Literacy Survey. Retrieved from https://www.dvv-international.de/index.php?id=696&L=1
Lao PDR	Lao National Literacy Survey (LNLS).	UNESCO Vientiane, UNESCO Bangkok, and Ministry of Education.	Single country	people aged 15-59.	household roster and individual questionnaire	reading, writing, numeracy, and visual literacy skills.	2001	"A literate person is the one who can read and write simple sentences in any language and who can also perform simple calculations" (UNESCO Bangkok, 2004, p. 44).	UNESCO Bangkok. (2004). Lao National Literacy Survey 2001: Final report. Bangkok: UNESCO Asia and Pacific Regional Bureau for Education. Retrieved from http://unesdoc.unesco.org/images/0013/001352/135263eb.pdf	UNESCO Bangkok. (2004). Lao National Literacy Survey 2001: Final report. Bangkok: UNESCO Asia and Pacific Regional Bureau for Education. Retrieved from http://unesdoc.unesco.org/images/0013/001352/135263eb.pdf

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
New Zealand	The Literacy and Numeracy for Adults Assessment Tool	Tertiary Education Centre of Ministry of Education	Single country	people aged 16 and older	online adaptive tool	reading with understanding, general numeracy, and writing to communicate	Since 2010	The Learning Progressions for Adult Literacy and Numeracy refer to "the main elements or strands of learning adults require in order to listen with understanding, speak to communicate, read with understanding, write to communicate, make sense of number to solve problems, reason statistically and measure and interpret shape and space" (Tertiary Education Commission, 2008a, as cited in Ministry of Education, 2014, p. 3).	Ministry of Education of New Zealand (2012). Assessing skills of adult learners in 2011: Profiling skills and learning using the Literacy and Numeracy for Adults Assessment Tool. Retrieved from https://www.educationcounts.govt.nz/__data/assets/pdf_file/0009/114957/Assessing-skills-of-adult-learners-in-2011.pdf	Ministry of Education of New Zealand. (2014). Comparing the Adult Literacy and Life Skills Survey and the Literacy and Numeracy for Adults Assessment Tool. Tertiary education occasional paper 2014/01. Retrieved from http://thehub.superu.govt.nz/sites/default/files/41611_Measures-of-Adult-Literacy-and-Numeracy_0.pdf
Papua New Guinea	Education Experience Survey and Literacy Assessment	the Myer Foundation	Single country	people aged 15-60	questionnaire	reading, writing and numeracy, and comprehension	2006-2007, 2009-2011	Literacy is understood as the possession of reading, writing and numeracy skills and the ability to use such skills in familiar contexts in everyday life. The numeracy strands are "based on the belief that in order to meet the demands of being a worker, a learner and a family and community member, adults need to use mathematics to solve problems" (Tertiary Education Commission, 2008a, as cited in Ministry of Education, 2014, p. 3).	ASPBAE Australia Ltd. (2011). PNG Education Experience Survey and Literacy Assessment: A Report on 5 Provinces. Retrieved from http://www.aspbae.org/sites/default/files/pdf/PNG%20Education%20Experience%20Survey%20and%20Literacy%20Assessment.pdf	
Scotland	Scottish Survey of Adult Literacies (SSAL).	The Scottish Government.	Single country	16-65 year olds in Scottish households.	the paper and pen based SSAL2009 survey instruments.	prose literacy, document literacy, and quantitative literacy.	2009	Prose literacy is the knowledge and skills required to understand and to use information from texts such as newspaper articles and passages of fiction. Document literacy is the knowledge and skills required to locate and to use information contained in various formats such as timetables, graphs, charts and forms. Quantitative literacy is the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials.	Clair. R. St. (2009). Scottish survey of adult literacies 2009: Technical report.	Clair, R.St., Tett, L., & Maclachlan, K. (2010). Scottish survey of adult literacies 2009: Report of findings. Education Analytical Services, Lifelong Learning Research: Glasgow. Retrieved from http://www.gov.scot/Resource/Doc/319174/0102005.pdf

Country	Name of the study	Sponsor organisation	Geographical coverage	Target population	Data collection method	Skills assessed	Date of data collection	Definitions of literacy and/or numeracy	References to the definitions of the constructs	References to the source of information about the study
Thailand	The Reading of Population Survey 2015	National Statistics Office	private households in the Whole Kingdom (region within a country)	Persons aged 6 years or older	Stratified Two-stage Sampling/an electronic survey (E-Survey methodology) using Tablet PCs/face to face interview	literacy and numeracy proficiency	May 2018-June 2018 conducted every 3 year	Literacy: able to read and write simple sentences and understand at least one language/ Numeracy: able to calculate the simple computation	http://www.nso.go.th/sites/2014en/Pages/survey/Social/Gender/The-Reading--Behavior-Of-Population-Survey--.aspx	http://www.nso.go.th/sites/2014en/Pages/survey/Social/Gender/The-Reading--Behavior-Of-Population-Survey--.aspx
USA	Adult Literacy Supplemental Assessment (ALSA)	the U.S. Department of Education	Single country	the least-literate adults aged 16 and above.	Questionnaire.	basic (word-level) reading skills, higher literacy skills, and background knowledge.	last assessment was conducted in 2003.	"*Literacy* is the ability to use printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential." (National Research Council, 2005, p.25) "*Prose literacy*: the knowledge and skills needed to locate, understand, and use information contained in expository and narrative prose text, such as editorials, newspaper articles, poems, and stories". (National Research Council, 2005, p.26) "*Document literacy*: the knowledge and skills required to locate, understand, and use relevant information found in documents, such as job applications, bus schedules, maps, payroll forms, indexes, and tables". (National Research Council, 2005, p.26) "*Quantitative literacy*: the knowledge and skills needed to apply basic arithmetic operations, alone or sequentially, to numbers embedded in printed materials, such as entering cash and check amounts onto a bank deposit slip, balancing a checkbook, completing an order form, and determining the amount of interest from a loan advertisement". (National Research Council, 2005, p.26)	National Research Council. (2005). Measuring Literacy: Performance Levels for Adults. Washington, DC: The National Academies Press. https://doi.org/10.17226/11267.	National Center for Education Statistics. (.n.d.). The ALSA Fact Sheet. Retrieved from https://nces.ed.gov/naal/fct_adultliteracy.asp

7.2 Annex 2: Summary of attributes and components measures in assessments (Murray, 2018)

	IALS	ALL	PIAAC / STEP	LAMP	Skills for Life	IVQ	LEO	KNALS	BLAS
Defines literacy as a continuum	YES	YES	YES	YES	YES	YES	YES	YES	YES
Literacy mixed with other domains	NO	NO	NO	NO	NO	Yes, writing	NO	YES	YES
Combine prose and document literacy	NO	NO	YES	NO	NO	YES	YES	YES	YES
Approximate proficiency range covered by main assessment	180-500	180-500	180-500	150-500	150-500	125-225	100-225	150-375	100-180
Scaling	3 parameter IRT	3 parameter IRT	3 parameter IRT	3 parameter IRT	3 parameter IRT	CTT	1 parameter IRT	1 parameter IRT	CTT
Components measured	none	Letter recognition	Letter recognition	Letter recognition	None		Letter recognition		
							Word recognition		Word recognition
		Decoding fluency and accuracy	Decoding fluency and accuracy	Decoding fluency and accuracy					
		Working memory	Working memory	Working memory					

		Receptive vocabulary	Receptive vocabulary	Receptive vocabulary					
			Sentence fluency						
							Sentence processing		
			Passage fluency						
		Spelling		Spelling					
Zero established	NO	YES	YES	YES	NO	NO	NO	YES	YES
Components analyzed to reveal patterns	N/A	YES	NO	NO	N/A	NO	NO	NO	NO
Proficiency levels	N/A	Latent class	NO	NO	N/A	Multi domain conditional raw scores	Quantiles based on Rasch scores	Quantiles based on Rasch scores	Quantiles based on raw scores
Accurate placement on scale	N/A	NO	NO	YES	YES	NO	YES	YES	NO

7.3 Annex 3: Literacy Proficiencies Distribution in PIAAC and STEP Participating Countries

7.4 Literacy Proficiencies Distribution in PIAAC and STEP Participating Countries

	Below Level 1	Level 1	Level 2	Level3	Level 4	Level 5	Missing	Income Level
Armenia	3.25	13.33	58.42	24.17	0.82			Upper Middle
Australia	3.1	9.4	29.2	39.4	15.7	1.3	1.9	High
Austria	2.5	12.8	37.2	37.3	8.2	0.3	1.8	High
Bolivia	26.16	34.22	29.22	9.65	0.75			Lower Middle
Canada	3.8	12.6	31.7	37.3	12.8	0.9	0.9	High
Chile	20.3	33.1	31.8	12.9	1.6		0.3	High
Colombia	13.39	22.79	41.67	21.67	0.49			Upper Middle
Cyprus	1.6	10.3	33.0	32.1	5.2	0.2	17.7	High
Czech Republic	1.5	10.3	37.5	41.4	8.3	0.4	0.6	High
Denmark	3.8	11.9	34.0	39.9	9.6	0.4	0.4	High
England (UK)	3.3	13.1	33.1	36.0	12.4	0.8	1.4	High
Estonia	2.0	11.0	34.3	40.6	11.0	0.8	0.4	High

Finland	2.7	8.0	26.5	40.7	20.0	2.2		High
Flanders (Belgium)	2.7	11.3	29.6	38.8	11.9	0.4	5.2	High
France	5.3	16.2	35.9	34.0	7.4	0.3	0.8	High
Georgia	6.46	18.94	54.3	19.54	0.76			Lower Middle
Germany	3.3	14.2	33.9	36.4	10.2	0.5	1.5	High
Ghana	61.4	17.47	17.05	3.79	0.29			Lower Middle
Greece	4.9	21.6	41.0	26.0	5.0	0.5	1.0	High
Ireland	4.3	13.2	37.6	36.0	8.1	0.4	0.5	High
Israel	8.0	19.0	33.0	29.3	7.7	0.4	2.4	High
Italy	5.5	22.2	42.0	26.4	3.3		0.7	High
Jakarta (Indonesia)	32.1	37.2	24.8	5.4	0.5			Lower Middle
Japan	0.6	4.3	22.8	48.6	21.4	1.2	1.2	High
Kenya	36.91	30.47	26.48	5.93	0.21			Lower Middle
Korea	2.2	10.6	37.0	41.7	7.9	0.2	0.3	High
Lithuania	2.2	12.9	39.7	34.6	6.0	0.2	4.5	High
Netherlands	2.6	9.1	26.4	41.5	16.8	1.3	2.3	High

New Zealand	2.5	9.3	30.2	40.3	14.7	1.1	1.9	High
Northern Ireland (UK)	2.5	14.9	36.2	34.3	9.4	0.5	2.2	High
Norway	3.0	9.3	30.2	41.6	13.1	0.6	2.2	High
Poland	3.9	14.8	36.5	35.0	9.0	0.7		High
Russian Federation	1.6	11.5	34.9	41.2	10.4	0.4		Upper Middle
Singapore	10.1	16.0	30.5	32.3	9.7	0.4	1.0	High
Slovak Republic	1.9	9.7	36.2	44.4	7.3	0.2	0.3	High
Slovenia	6.0	18.9	37.7	31.2	5.4	0.2	0.6	High
Spain	7.2	20.3	39.1	27.8	4.6	0.1	0.8	High
Sweden	3.7	9.6	29.1	41.6	14.9	1.2		High
Turkey	12.7	33.1	40.2	11.5	0.5		2.0	Upper Middle
Ukraine	4.03	9.49	40.04	42.92	3.4	0.12		Lower Middle
United States	3.9	13.6	32.6	34.2	10.9	0.6	4.2	High
Vietnam	12.7	20.3	34.7	29.9	2.5			Lower Middle

Note: *These calculations are based on PIAAC (2012, 2015) and STEP (2012, 2013) data, together including 42 countries and economies covering high, upper- and lower-middle income countries. Percentages may not add up to 100% due to the presence of a group of the population who were not answer the background questionnaire or to take the assessment for language related reasons.*