Modupe Adefeso-Olateju[1], Muhammad Usman[2] and Oyindamola Adegboue[3]

Measuring SDG 4: Experiences from designing and implementing an international citizen-led assessment in Africa

Draft paper for the Africa Knows! Conference; Panel B12

Abstract

With the World Development Report (World Bank, 2018) placing a significant proportion of children at risk of not learning in Africa, the prospects of realizing SDG 4 remain uncertain. According to Global Education Monitoring Report (2015), all the countries in Africa are spending over 10% of their national budgets to finance education coupled with private sector support, household expenditure, and official assistance flows. Comparable assessments for learning throughout Africa is necessary to create regional responses to solve the learning crisis within the global south context.

Since 2005, developed countries in the global south within the People's Action for Learning (PAL) Network have implemented country-specific, household-based, citizen-led assessments using simple instruments. These assessments have sought to establish the basic reading and numeracy competencies of children. However, the absence of comparable, contextually relevant, and robust international metrics is one challenge in measuring the progress towards achieving SDG 4. Even with the up-gradation of the indicator 4.1.1(a) from tier three to tier one, the lack of appropriate methodologies to track the achievement of the same is a source of concern. It is for this reason that the PAL Network designed and implemented a common citizen-led assessment of numeracy in its then-thirteen member countries (seven from Africa) from 2019 into early 2020. The assessment implemented in one rural district in each of the 13 participating countries focused on numeracy while utilising over 700 local volunteers who visited over 15,000 households in 779 villages to assess 20,088 children aged 5-16 years.

This paper presents the experiences of designing an internationally comparable assessment of learning as an effort to measure progress towards the achievement of SDG 4 in the global south. The paper also presents the preliminary findings from the study, outlining the numeracy competencies of children across various age groups as well as grades. This paper concludes that it is possible to design and implement an internationally robust and comparable assessment of learning outcomes in Africa and beyond.

Key words: Assessments, Numeracy, Citizen-led Assessments, SDGs, ICAN, Consensus-building

1. Introduction

Since 1964, international assessments have been part of the global education landscape, when the International Association for the Evaluation of Educational Achievement (IEA) conducted the first internationally comparative study in mathematics for 12 participant countries. Ever since, there has been increased prioritisation of international global and regional educational assessments targeted at a variety of grade levels and testing a number of different subjects including reading, mathematics, science, civics and citizenship (Cresswell et al. 2015).

Lockheed (2008) argues that these "large-scale" international assessments have to meet the three main criteria which include: (1) involving multiple countries (2) adopting standardised test tools in terms of content, procedure, timing and scoring and (3) involving

[1] Dr. Modupe (Mo) Adefeso-Olateju is Managing Director of The Education Partnership Centre (TEP Centre); Nigeria's pioneering education partnership organization. To reach her, email mo.olateju@tepcentre.com

[2] Muhammad Usman is the Senior Program Officer at PAL Network. To reach him, email musman@palnetwork.org

[3] Oyindamola Adegboue is the Management Trainee of TEP Centre. To reach her, email oyinda.adegboye@tepcentre.com

a large sample of participants scientifically chosen from comparable populations. According to Wagner (2011), international assessments are planned and implemented by various international agencies for different reasons. Some of them include: cross-national comparisons on education policy issues, generating league tables that rank educational achievement of countries or regions, and measuring trends progressively.

Globally, there is still limited measurement of learning achievement in many countries especially in the foundational learning skills. Basic numeracy skills in children during the early grades is not only crucial for future success in mathematics but in building a strong conceptual foundation. (Hattori et al. 2017). With the World Development Report (World Bank, 2018) placing a significant proportion of children at risk of not learning in Africa, the prospects of realizing SDG 4 remain uncertain without a comparable assessment tailored towards the learning needs of Africa and the Global South at large.

In 2005, a group of researchers went to a small village in India to understand how and what children learn and ended up starting a nation-wide campaign to measure children's foundational reading and numeracy skills, in their homes. These assessments, later named ASER (Annual Status of Education Report) in South Asia, spread organically across many countries of Global South within a few years of their inception. Over the past 15 years, data collected though their "citizen-led assessments" (CLA) approach, demonstrated that children who fail to acquire the foundational skills in the early grades fall further and further behind, with fewer opportunities to catch up later on. Countries adapted the CLAs according to their own country context and pegged the assessments on their national curriculums.

In 2015, the People's Action for Learning (PAL) Network was established as a South-South partnership of organisations across three continents engaged in conducting CLAs. In its first strategy of 2015-16, PAL focused on establishing and strengthening the coordinating body but in the second strategy period 2017-19 the focus shifted to creating a network-wide Data Quality Standards Framework (DQSF) and a Common Assessment that could generate comparable results.

In late 2019 and early 2020, PAL Network member organizations conducted a large-scale household-based assessment using the ICAN assessment tool in 13 low- and middle-income countries across Africa, America and Asia. The first round of scaled-up implementation was restricted to one rural district in each participating country, in order to test feasibility in a variety of geographies. ICAN uses a homogenous assessment framework and assessment items. It is simple-to-use and scalable tool that measures children's foundational numeracy, covers a number of important domains such as spatial orientation, measurement and shape recognition that commonly exist in curricula for primary grades 2 or 3 as well as in the minimum proficiency level criteria established for SDG 4.1.1 (a).

This paper presents the experiences of designing an internationally comparable assessment of learning as an effort to measure progress towards the achievement of SDG 4 in the global south. We begin by situating the need for comparable international assessments in the Global South and specifically in Africa. The paper then discusses ICAN's CLA approach and its value in cross-national contexts. More importantly, we discuss the consensus building process among member countries, which have varying national priorities and the enablers of this consensus. This paper concludes that it is possible to design and implement an internationally robust and comparable assessment of learning outcomes in Africa in Africa and beyond.

2. SDG 4.1.1(a): Measuring Progress through Foundational Skills

In the past two decades, there has been significant progress in achieving universal primary education. Among all developing regions, sub-Saharan Africa made the highest advancement, moving from 52 percent in 1990,

up to 78 percent in 2012 (UNDP, 2020). However a lot of disparities still persist in achieving Sustainable Development Goal (SDG) 4, which has replaced Millennium Development Goal 2 as the global goal for education. While the SDG 4 has shifted the focus from access to learning, the world faces a learning crisis largely due to the lack of information on how to measure learning using a globally-accepted and understood metric - particularly in the global south (Jamil, 2020; Wagner et al. 2012; World Bank, 2019).

Each SDG comprises 'targets' and 'indicators' that help countries measure their progress towards the goal by 2030. The first indicator within Target 4.1 monitors the number of children and young people who have attained minimum proficiency reading and mathematics in grade 2 or 3, end of primary education and lower secondary education (UNESCO Institute for Statistics, 2018). SDG 4.1.1 (a) which focuses on foundational reading and numeracy skills, represents the most basic of the learning targets outlined in SDG 4. However, there is still a dearth of comparable data as the majority of existing international assessments focus on the end of primary schooling and beyond (Wagner et al. 2012; PAL Network, 2020). Among assessments that focus on foundational learning skills including Early Grade Reading/Math Assessment (EGRA/ERMA), the tasks particularly in numeracy are limited leaving out important domains for class 2 and 3 such as shape recognition, spatial orientation and measurement (PAL Network, 2020).

2.1 The Need for International Learning Assessments in the Global South

There are diverse views on the impact and significance of international learning assessments. Arguments in favour of these assessments point to their value in cross-country comparisons for countries of similar levels of economic development, which could inform investment decisions, regulatory reforms, organisational structures and teacher behaviour (Wagner et al. 2012). Moreover, they argue that participation in international assessments helps countries build local technical and managerial capacity such as in the area of developing their own national large-scale assessments (Wagner et al., 2012). These assessments can also provide useful information about the outputs of education systems thereby holding them accountable (Lockheed, 2008).

Generally, the participation of developing countries in national, regional and international assessments has increased from 28 percent in the 1990s to 50 percent between 2000 and 2006 (UNESCO, 2008). As at 2013, 47 countries in Sub-Saharan Africa (SSA) had participated in the Monitoring Learning Assessment (MLA) I and II studies, 12 in PASEC and 15 in SACMEQ (Braun & Kanjee, 2006; Kellaghan & Greaney, 2004 as cited in Sayed & Kanjee, 2013). Broadly speaking, international learning assessments imply measuring learning outcomes across multiple countries gathering data from learners, teachers and educational systems (Wagner, 2011). This has significant differences from national high-stake examinations which still inform the core of assessment systems in many countries in SSA (Sayed & Kanjee, 2013).

However, there are a number of challenges associated with international assessments particularly in the Global South. First, these assessments are based on models and methods developed in the Global North, where the reality is starkly different from countries in the Global South, including a track record of universal enrolment, high number of literate parents, and established assessment frameworks. Furthermore, the majority of existing international assessments generate evidence that informs policymakers and education planners excluding local actors like teachers and parents (PAL Network, 2020).

Even as international assessments like PISA seek to diversify participation by expanding to low and middle-income countries, through PISA for Development (PISA-D); they fall short of reflecting contextual needs. Pizmony-Levy (2016) argues that these assessments do not particularly fit the educational realities in Africa when compared to regional assessments like SACMEQ and PESAC which are embedded in the local context and more flexible to change.

Among other reasons, the author argues that PISA D's sample of 15-year-old students may not be suitable in many African countries which still have low net enrolments in lower secondary school. Hence, achievement scores could reflect a low variance from the overestimation. PAL Network (2020) affirms that evidence at lower levels of performance are urgently needed by school systems in Africa. Even in cases where learning assessment data is available in individual countries, these data is not robust enough because they exclude out-of-school children and are designed to achieve different national objectives.

3. The ICAN Premise

ICAN is an acronym for International Common Assessment for Numeracy, which is a multi-country, household-based, citizen-led assessment of basic (class 2 and 3 level) numeracy conducted in 13 countries from the global south - including seven in Africa (Singh, 2020; Jamil 2020). Informed by the realities of the Global South, the research and development of ICAN benefited from a participatory process that secured the buy-in of its member countries to create a tool that is robust, simple-to-use and reliable. It also integrates the differences and similarities of its diverse global south curricula (Singh, 2020).

The Citizen-led Assessment (CLA) approach was developed in 2005 in India when Pratham, one of South Asia's largest non-profits, launched the Annual Status of Education Report (ASER) to assess children's foundation skills irrespective of their schooling status (Carlitz & Lipovsek, 2017). By involving local volunteers and community leaders in data gathering, CLAs generate evidence for action that is easy to understand by a range of stakeholders across village, district, state and national levels (Singh, 2020). ASERs tools have been deployed by different countries in Africa including Uwezo in East Africa (2009), and similar initiatives in Mali (2011), Senegal (2012) and Nigeria (2015) (Carlitz & Lipovsek, 2017). After a series of deliberations, the UNESCO Institute of Statistics endorsed CLAs as a legitimate source of data in 2017 (Jamil, 2020).

Amidst the implementation of country-specific CLAs, the lack of comparable, contextually relevant, and robust international metrics still poses a challenge in measuring the progress towards achieving SDG 4. To address the issue of comparability, PAL Network designed and implemented a common citizen-led assessment of numeracy in its thirteen-member countries (seven from Africa) from 2019 into early 2020. The assessment implemented in one rural district in each of the 13 participating countries focused on numeracy while utilising over 1,500 local volunteers who visited over 15,000 households in 779 villages to assess children 20,088 children aged 5-16 years (PAL Network, 2020).

Having evolved from CLAs, ICAN is suitable for testing foundational skills in multiple situations both within and outside formal school settings making it relevant particularly in the wake of the COVID-19-induced school closures. Given that it uses common items, ICAN is also not as resource-intensive as many other international assessments, thereby reducing participation costs for countries in the global south. Unlike school-based large-scale assessments, ICAN does not overestimate the proportion of higher-competence learners; they reflect the real picture of the learning landscape (Singh, 2020). Finally, ICAN is designed as an oral, one-on-one assessment to capture what students know and can do, independently of whether or not they can read (PAL Network, 2020). Based on its adherence to principles of comparability and frequency, including the PAL Network's Data Quality Standards Framework (DQSF), and its inclusion of wider domains and skills, ICAN has the potential to be a global learning metric. Most importantly, the contextual relevance and sensitivity of ICAN to the educational challenges of the global south provide data that measures progress towards achieving SDG 4.1.1. (Nassereka, 2020).

While CLAs are designed with the hope of spurring citizen action through evidence generation, they do not always yield the intended outcomes. Carlitz and Lipovsek (2017) found that parents in areas where Uwezo

assessments were conducted in Kenya, were not more likely to take private or collective action when compared with their non-assessed counterparts. Some of the barriers to action they found included: minimal influence of citizens on key education inputs, widespread norms against unofficial collective action, low expectations of government officials and looking to elite for action. In their Information-Citizen Action Causal Chain, Lieberman et al. (2014) propose that it is important to understand the relationship between individuals and the information being provided, as well as individual's attitudes and beliefs to their political environment. Without these conditions in place, they argue that the intervention is less likely to lead to action.

4. Building Consensus amidst Varying National Priorities

One of the major milestones and distinctive characteristics of the common assessment design was the achievement of consensus on several components of the ICAN. PAL convened members of Project Management Team (PMTs) in Limuru, Kenya for three days in 2019, with the aim to build consensus on sampling, assessment tools, contextual indicators, survey process, quality control processes, communications etc.

We will briefly describe what these processes entail, key decisions on the processes, and enablers of the consensus building.

4.1 Sampling (district, village and target age group)

A tiered sampling approach of selecting the district and villages (which are named different in different geographies of PAL countries) was proposed along with which age group of children to be covered for the assessment. For first round of ICAN, the assessment was restricted to one rural district[4], to test feasibility in a variety of geographies in each participating country. 60 villages were selected from each district, while 20 households were selected from each village giving a 1200 household sample from each district.

While the CLAs in different PAL countries assessed different age groups, six out of thirteen start assessing children at age 5; and eight out thirteen finish assessing children at age 16. Considering this information, the proposed age group was to include 5 to 16 years old children in the sampled household, irrespective of their schooling status[5].

4.2 Defining 'numeracy' for early grades

Generally, there was a limited agreement in the network as to what 'numeracy' actually means but most definitions and frameworks included a broader view than just numbers and number operations. There was an expert consensus that two areas of Mathematics are particularly important for young children to learn i.e. Numbers and Geometry, spatial thinking and measurement (Cross, 2009). To help countries and civil society organizations measure the progress on SDG indicator 4.1.1, the UNESCO Institute of Statistics (UIS) came up with Minimum Proficiency Levels (MPLs). The MPL is defined as the percentage of children and young people in Grade 2 or 3 of primary education, at the end of primary education and the end of lower secondary education achieving at least a minimum proficiency level in (a) reading and (b) mathematics[6].

To design a more robust assessment, the group looked into several mathematics assessments and frameworks that covered cross-national, regional, national and survey-based assessments including other global frameworks[7]. With the exception of Mali and Senegal who included a few items on Geometry

[4] For ease of communication District' in this report refers to a sub-state/regional/provincial unit, which is known by different names in different countries. For instance, this unit is called a Local Government Area in Nigeria, a District in India, a Department in Senegal, and so on

[5] See Appendix 1: Prescribed age of entry in grade 1 and assessment age group in existing CLAs

[6] See Appendix 2 for examples of assessment performance descriptors that align with the MPL descriptor

[7] See Appendix 3 for names and categories of assessments and frameworks that were studied in depth

and Measurement, PAL members mostly covered the Numbers domain in their CLAs[8].

4.3 Contextual indicators

The contextual indicators were created to understand and compare the context in the sampled villages and households. The village indicators were divided into three categories. 1) Accessibility to the village, 2) basic services/facilities, and 3) education facilities. The household indicators were also divided into three categories of 1) size of the household (number of members and their age), 2) background of education, and 3) economic indicators (to understand if the households are more affluent or less.). Similarly, the child indicator was divided into three categories of 1) general information (age, gender etc.), 2) enrolment status, and 3) extra paid/supplementary help. For each of the proposed indicator within these categories a critical review was conducted by the members to see if the indicator(s) is easily observable or not, it's relevance to their local context, it's importance for ICAN, and if the definitions and comparability will work across context.

4.4 What to assess

The ICAN framework is divided into three set of tasks 1) numbers, 2) word problems, and 3) other domains. Set one tasks include counting and matching (single digit numbers), recognizing two-digit numbers, comparing two-digit numbers and operations such as subtraction. For set two tasks, the word problems assessed children's ability to handle operations in context, for example: addition/multiplication, subtraction and division. Set 3 tasks explore other domains by assessing some one or two tasks at knowledge level and one task at application level. It was agreed that after the ICAN, countries can also select sets or tasks they want to try out in their own assessments.

4.5 Enablers of Consensus Building

On the last day of the 4-day consensus building workshop, the ICAN team managed to reach at many key decisions including: the assessment objectives, sampling and scope of the study, village survey processes, translation, monitoring and recheck and target age group were taken[9]. This section discusses some of the enablers of consensus building:

4.5.1 Working Groups

The Working Groups (WG) and Committees were formed in 2017 to support in attaining the mission, vision and mandate of the Network. They provided opportunities for the experienced staff members to contribute to specialist technical expertise to the network. The WGs work on ad-hoc basis. Expert members come together to solve a challenge that concerns the network. There are six working group bodies in PAL Network i.e. Assessment, Data, Communication, Research, Test Development and Fund Raising. For the ICAN, all of them came together and helped in their own way while the Assessment Working Group led the way.

4.5.2 Project Management Teams (PMTs)

Developing and implementing a common assessment across varied country contexts posed varying challenges under the categories of: 1) development, 2) implementation and 3) communication. To overcome these challenges, a designated, two staff Project Management Team (PMT) from each of the 13 participating country was formed. Two PMTs per country were a perfect composition with one member leading planning and budgeting at the project level, while the other member managed field piloting, partnerships and field implementations.

[8] Appendix 4 illustrates which country covered what domain and sub-domain, description of tasks and sample items.

[9] See Appendix 5 for key decisions from the consensus building workshop

4.5.3 Language

PAL Network operates in three official languages i.e. English, French and Spanish. For any meeting, language can be a big barrier if not all participants speak the same language. To enable participants to get the best out of their participation in meetings, we ensured two things: Translation and Interpretation. First, all workshop material for pre, during and post consensus building activities were provided in the three official languages. Second, during the consensus-building meetings and all other virtual consultations held with Project Management Teams or Country Leadership, a simultaneous language interpretation service was organized. This meant that all speakers were free to speak in the language of their chosen and rest of the delegates understood it. Creating an environment where everyone feels welcomed and can speak their mind, in the language that they fluently speak, can make a big difference.

5. Findings

ICAN 2019 was implemented in 13 countries, but given the limited scale of implementation in each country, the intention in this first round of implementation was to understand the kinds of comparisons that the use of ICAN on scale facilitates, rather than to compare these specific districts. (ICAN Report)

Since this paper focused mainly on the consensus building part of the process, we have borrowed the Sections 5 and 6, Readers' guide to ICAN 2019 survey findings and illustrative comparisons using ICAN 2019 data, respectively (Pages 21-30 of PAL Network ICAN report, 2020). These findings are therefore indented:

Section 5 - ICAN Report: Readers' guide to ICAN 2019 survey findings

Overview

"ICAN 2019 uses a simple-to-use assessment tool, administered one-on-one with children in their homes. The same tool is used with all children in the age group of 5-16.

ICAN 2019 data from the first round of large-scale household-based implementation, described in the preceding section of this report, provides a snapshot of foundational numeracy in one rural district in each of the 13 participating countries. The sampling strategy generates a representative picture only of the sampled district. Therefore, ICAN 2019 data from this round cannot be used as a proxy for national estimates or to compare countries. Rather, this exercise aimed to demonstrate proof of concept in two ways:

- To demonstrate the feasibility of using a common assessment framework and set of tools across very different country contexts; and
- To highlight the ways in which ICAN can be used to generate estimates that respond to important questions confronting countries in the Global South."

In the Appendix 6, we provide illustrative examples of how ICAN can provide important evidence with which to answer questions regarding children's foundational numeracy[10].

[10] Appendix 6 presents comparative data that has been anonymised; districts are referenced as Location 1, Location 2 and so on. Each page poses a question; displays evidence using ICAN 2019 data that speaks to that question; and summarises what this evidence tells us. The examples provided are intended to illustrate some of the ways in which data from the ICAN assessment tool and contextual questionnaires can be used.

6. Conclusion

The review of the literature on citizen-led assessments highlights the unique rand context-based role that a common assessment of learning like ICAN plays in generating evidence on learning outcomes in the global south. From a conceptual lens, this comparable assessment of learning fills a critical gap in the evidence base for Sustainable Development Goal Target 4.1.1, offering many developing countries the opportunity to methodically and rigorously measure foundational learning. From a methodological perspective, the process of designing and implementing ICAN in low-and-medium-income countries demonstrates how robust and internationally comparable assessments of learning outcomes can be achieved by prioritising consensus and contextually relevant indicators and tools. From the perspective of evidence and results, data from the first ICAN study highlights the potential of these assessments to provide important evidence with which to answer questions regarding children's foundational numeracy, and which in the future may be extended to measures of foundational literacy

References

Braun, H., & Kanjee, A. (2006). Using assessment to improve education in developing nations. In J. E. Cohen, D. E. Bloom, & M. B. Malin (Eds.), *Educating all children: A global agenda* (pp. 303–353). Cambridge, MA: MIT Press.

Carlitz, R., & Lipovsek, V. (2017). *Citizen-led assessments and their effects on parents' behavior*. https://palnetwork.org/wp-content/uploads/2017/06/Citizen-led-assessments-and-their-effects-on-parents-behavior_Ruth-Carlitz-and-Dr.-Varja-Lipovsek.pdf

Cresswell, J., Schwantner, U., & Waters, C. (2015). A Review of International Large-Scale Assessments in Education: Assessing Component Skills and Collecting Contextual Data, PISA, The World Bank, Washington, D.C./OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264248373-en

Christopher T. Cross, T. A. (2009). Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity. Committee on Early Childhood Mathematics. Washington, DC: Center for Education, Division of Behavioral and Social Sciences and Education. The National Academies Press.

Department of Education and Skills. (2011). *Literacy and numeracy for learning and life: The national strategy to improve literacy and numeracy among children and young people 2011–2020*. https://www.education.ie/en/Publications/Policy-Reports/lit_num_strategy_full.pdf

Gove, A., & Cvelich, P. (2011). *Early reading: Igniting education for all. A report by the early grade learning community of practice. RTI International*. http://img.asercentre.org/docs/ASER%202018/Release%20Material/English%20files/ensuringfoundationallearningforallchildren.pdf

Hattori, H., Cardoso, M., & Ledoux, B. (2017). *Collecting data on foundational learning skills and parental involvement in education*. UNICEF New York. https://mics.unicef.org/files?job=W1siZiIsIjIwMTcvMDYvMTUvMTYvMjcvMDAvNzMxL01JQ1NfTWV0aG9kb2xvZ2IjYWxfUGFwZXJfNS5wZGYiXV0&sha=39f5c31dbb91df26

Jamil, B. R. (2020, June 7). Introducing ICAN (International Common Assessment of Numeracy) as a Global Learning Metric. *PAL Network*. https://palnetwork.org/introducing-ican-international-common-assessment-of-numeracy-as-a-global-learning-metric/

Kellaghan, T., & Greaney, V. (2004). Monitoring performance: Assessment and examinations in Africa. Paris: Association for the Development of Education in Africa. In Sayed, Y., & Kanjee, A. (2013). Assessment in Sub-Saharan Africa: challenges and prospects. *Assessment in Education: Principles, Policy & Practice,* 20(4), 373–384. doi:10.1080/0969594x.2013.849056

Lieberman, E. S., Posner, D. N., & Tsai, L. L. (2014). Does information lead to more active citizenship? Evidence from an education intervention in rural Kenya. *World Development, 60*, 69-83. doi: https://doi.org/10.1016/j.worlddev.2014.03.014

Lockheed, M. (2008). Measuring progress with tests of learning: Pros and cons for 'cash on delivery aid' in education. *Center for Global Development Working Paper,* (147).

Nassereka, F. (2020, August 16). PAL Network's International Common Assessment of Numeracy (ICAN): Why is it Relevant Today?. *PAL Network*. https://palnetwork.org/pal-networks-international-common-assessment-of-numeracy-ican-why-is-it-relevant-today/

PAL Network (2020). *ICAN: International Common Assessment of Numeracy. Background, Features and Large-scale Implementation. Nairobi: People's Action for Learning Network*. https://palnetwork.org/wp-content/uploads/2020/07/2020_PAL-Network_ICAN-Report_EN.pdf

Pizmony-Levy, O. (2016, July 28). Should countries in Africa use PISA for development?. *Education International*. https://www.ei-ie.org/en/woe_homepage/woe_detail/4874/should-countries-in-africa-use-pisa-for-development

Sayed, Y., & Kanjee, A. (2013). Assessment in Sub-Saharan Africa: challenges and prospects. *Assessment in Education: Principles, Policy & Practice, 20*(4), 373–384. doi:10.1080/0969594x.2013.849056

Singh, R. (2020, August 14). International Common Assessment of Numeracy and COVID-19 Crisis. *PAL Network*. https://palnetwork.org/international-common-assessment-of-numeracy-and-covid-19-crisis/

UNESCO. (2008). Benavot, A., & Tanner, E. (2008). The growth of national learning assessments in the world, 1995-2006. *Background paper for the Education for all global monitoring report*. https://d1wqtxts1xzle7.cloudfront.net/3960611/Benavot_and_Tanner.pdf?response-content-disposition=inline%3B+filename%3DThe_Growth_of_National_Learning_Assessme.pdf&Expires=1606524967&Signature=WYTDCf29M5h6h60Lp7VlP0Va0BFEVA-411ljp2srQoCTanrdSg-IhvPaCS1SzrX2bR0oMy7t42noEi2mwGg3jQ0PA16K8vtzc5HIynU5KVz~irNLa-NO8DJjg671uqC4KWUYwp0JAP86Gqzy9hp0Hk6PFt2u0L2HJwoh4dfPTrUEPIF3c36pvCkG9xLCUMH--cU5UxwB6dBGFSaTq94ed1Q9Oi0Omr4Ew~maRIpsvr8VWSq1Y~8-a7fzeNiDz5StUOZaZMDciKB-vvHVguI34dQJq3GHiJtlyCTCnVHyU16zN6cdEaI0qufZx-kt-Nb-5CV4JFv5-eNRbZzxFCAWDA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

UNDP. (2020). *Sustainable Development Goals: Goal 4*. https://www.undp.org/content/seoul_policy_center/en/home/sustainable-development-goals/goal-4-quality-education.html

Wagner, D. A., Lockheed, M., Mullis, I., Martin, M. O., Kanjee, A., Gove, A., & Dowd, A. J. (2012). The debate on learning assessments in developing countries. *Compare: A Journal of Comparative and International Education, 42*(3), 509-545.https://www.researchgate.net/publication/254238945_The_debate_on_learning_assessments_in_developing_countries

Wagner, D.A. (2011*). Smaller, Quicker, Cheaper: Improving Learning Assessments for Developing Countries*. Paris: UNESCO-IIEP. https://repository.upenn.edu/cgi/viewcontent.cgi?article=1004&context=literacyorg_chapters

World Bank. (2018). *World Development Report 2018: Learning to Realize Education's Promise.* Washington, DC: World Bank. doi:10.1596/978-1-4648-1096-1. License: Creative Commons Attribution CC BY 3.0 IGO

World Bank. (2019, January 22). *The Education Crisis: Being in School Is Not the Same as Learning*. https://www.worldbank.org/en/news/immersive-story/2019/01/22/pass-or-fail-how-can-the-world-do-its-homework

Appendixes

Appendix 1: Prescribed age of entry in grade 1 and assessment age group in existing CLAs

Country name	Prescribed age of entry at school in Grade 1	Assessment age-group
India	6 years	5-16 years
Pakistan	5 years	5-16 years
Nepal	5 years	5-16 years
Bangladesh	6 years	5-12 years
Kenya	6 years or 7 years	6-16 years
Uganda	6 Years	6-16 years
Tanzania	6 years	6-16 years
Mozambique	6 years	7-16 years
Mali	6 years	6-14 years
Senegal	7 years	9-16 years
Nigeria	6 years	5-15 years
Mexico	6 years	7-17 years
Nicaragua	6 years	5-13 years

Appendix 2: UIS Minimum Proficiency Levels (MPLs) for grades 2 and 3 - Math

Minimum proficiency level (MPL) descriptor	Assessment performance descriptors	Assessment level descriptor (extended)
Students demonstrate skills in number sense and computation, shape recognition and spatial orientation.	PASEC 2014 – Level 1	• Students progressively develop their knowledge of the mathematical language and master the first concepts of quantity (quantification, comparison) with objects and numbers under twenty. • Students can appraise the relative size of objects, recognize simple geometric shapes and they develop an awareness of the first concepts of spatial orientation (inside, outside).
	PASEC 2014 – Level 2	• Students can recognize numbers up to one hundred, compare them, complete logical series and perform operations (sums and subtractions) with numbers under fifty. • Students have developed awareness of spatial orientation (below, above, beside). • Students begin to develop an ability to solve basic problems with numbers under twenty using reasoning skills.
	TERCE 2014 – Level 2	Students can: • Read and write natural numbers • Interpret simple fractions • Identify the units of measurement or instruments best adapted to measure attributes of a known object. • Identify relative positions of objects on a map • Identify elements on geometric figures or flat representations of geometric shapes
		• Extract information delivered in tables and graphs

Appendix 3: Assessments and Frameworks studied for consensus building

Sno.	Name of the assessment/framework	Category
1	Trends in International Mathematics and Science Study (TIMSS)	Cross-national assessments
2	Trends in International Mathematics and Science Study Numeracy (TIMSS Numeracy)	
3	Literacy and Numeracy Assessment (LaNa)	
4	Programme d'analyse des systèmes éducatifs de la CONFEMEN (PASEC)	Regional assessments
6	Pacific Islands Literacy and Numeracy Assessment (PILNA)	
7	South East Asia Primary Learning Metrics (SEA-PLM)	
8	UNESCO International Bureau of Education and UNESCO Institute of Statistics review of national assessments	Review of national assessments
9	Early Grade Mathematics Assessment (EGMA)	Survey based assessments
10	Multiple Indicator Cluster Surveys (MICS)	
11	UNESCO Institute of Statistics' Minimum Proficiency Levels	Other frameworks
12	Australian Council for Educational Research's Learning Progression Explorer for Mathematics (ACER-LPE)	
13	Australian Council for Educational Research's Numeracy Test Model for Citizen-led Assessments	

Appendix 4: Number of sub-domains covered

DOMAIN	SUB-DOMAIN	DESCRIPTION OF TASK	SAMPLE ITEM	PAL NETWORK COUNTRY MEMBER											NUMBER OF COUNTRIES
				INDIA	PAKISTAN	NEPAL	KENYA	UGANDA	TANZANIA	MOZAMBIQUE	MALI	SENEGAL	NIGERIA	GHANA	MEXICO	
GEOMETRY	Construction - plane figures	Drawing 2D geometric shape	Using scale and pencil, draw a square								✓	✓				2
	Properties - plane figures	Recognizing 2D geometric shapes	From the box, recognize a rectangle								✓	✓				2
	Spatial orientation	Identifying position of objects in relation to a given object	The administrator asks the child to locate the tree, the bird, the balloon and the cat in relation to the man in the picture below.								✓					1
MEASURE--MENT	Standard units	Using units of measurement	Items given in left columns (for instance a rope, a can of oil, etc.) and units of measurement on the right.								✓	✓				2
	Combined operations (problem solving - multiplication and division)	Solving word problem with mixed operations (multiplication 1 digit with 1 digit) and (addition 2 digit with 1 digit) and (multiplication 2 digit with 2 digit)	Sofia bought sweets for her 15 students and gave each of them 1 chocolate, 2 chewing gum and 1 palette. If the chocolates cost $ 7.00, the pallets $ 2.00 and the chewing gum $ 6.00. How much did he spend for all the candy he bought?												✓	1
	Division	Dividing 3 digit by 1 digit with remainder	879 divided by 7 (in long division form)	✓												1
	Division	Dividing 3 digit by 1 digit without remainder	256 divided by 4 (in long division form)												✓	1
	Multiplication	Multiplying 3 digit with 1 digit	351 X 4									✓				1
	Division (problem solving)	Division word problem 2 digit with 1 digit without remainder	Mom Florinda has 4 children attending Primary School June 25. She received 12 notebooks to distribute to her children. How many notebooks will each child receive? How much money was he left with after buying?							✓						1
	Division	Dividing 2 digit by 1 digit without remainder	78 ÷ 3		✓	✓	✓	✓						✓		5
	Multiplication	Multiplying 1 digit with 2 digit	2 X 10 =								✓	✓				2
	Multiplication (problem solving)	Solving multiplication word problem 1 digit with 1 digit	Oumou bought 5 mangoes at 3 francs each. How much did she spend on everything?							✓	✓					2
	Division	Dividing 1 digit by 1 digit without remainder	2 ÷ 2					✓		✓				✓		3
	Multiplication	Multiplying 1 digit by 1 digit	4 X 5 =				✓	✓	✓	✓	✓	✓	✓	✓		8
	Recognizing and comparing number	Recognizing and comparing 2 digit numbers (which is bigger)	11 or 16 which is bigger						✓	✓	✓					3
	Recognizing number	Recognizing 2 digit numbers	51	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	11
	Counting and writing number	Counting and writing 2 digit numbers	12 oranges shown in picture. Count and write 12									✓				1
	Recognizing and counting number	Recognizing 2 digit numbers, counting and making lines	15 written. Make 15 lines								✓					1
	Addition (problem solving)	Solving addition word problem 1 digit with 1 digit without carryover	Mariam bought three mangoes at Ghc3.00 and a packet of biscuit at Ghc2.00. How much did she pay?											✓		1
	Subtraction	Subtracting 1 digit with 1 digit	8 - 2 =								✓	✓		✓		3
	Addition	Adding 1 digit with 1 digit without carryover	5 + 3 =								✓			✓		2
	Recognizing and comparing number	Recognizing and comparing numbers 1-9 (which is bigger)	6 or 9 which is bigger								✓					1
	Counting and recognizing number	Counting, recognizing and matching numbers 0-9	4 balls (in left column) to be counted and matched with numeral 4 (in right column)				✓	✓	✓	✓			✓	✓		6
	Counting and writing number	Counting and writing numbers 1-9	9 oranges shown in picture. Count and write 9								✓					1
	Recognizing number	Recognizing numbers 1-9	1	✓	✓	✓					✓					4
NUMBER OF SUB-DOMAINS COVERED				4	4	4	8	9	10	11	20	16	6	11	5	

Appendix 5: Key Decisions from the Consensus Building Workshop

Key decisions from Consensus Building workshop

On the last day of the 4-day consensus building workshop the ICAN team managed to reach many key decisions and a few decisions were left for further discussion and agreements to be taken electronically. The agreements on objectives of the ICAN, sampling and scope of the study, village survey processes, translation, monitoring and recheck and target age group were taken.

*All members agreed on the following **objectives of the ICAN**:*

- The ICAN will add value at several levels including – contributing to global education monitoring efforts, strengthening the network's offering, in-country education-related discussions and to individual team members involved in this project.
- There is a need to refine the rationale document to add more details about uniqueness of the citizen-led assessment and justifying the new phase of common assessment.

*All members agreed on the following **target age group of children**:*

- All 5 years to 16 years old children (in the sampled households) whether or not enrolled in school form the target population of the ICAN and will be assessed using the finalized assessment tool

*All members agreed on the following **sampling and scope processes**:*

- the PAL Common Assessment will be representative of the rural areas of the sampled district where
  - district (as called by local names) is a sub-state/sub-provincial level unit
  - rural means as defined by local statistical/census departments
- to avoid confusion – district is termed as "Tier 1 Unit" and rural communities (sampled in 1st stage) are termed as "Tier 2 Unit"
- the PAL Common Assessment will employ a 2 stage sampling strategy in the sampled Tier 1 unit (equivalent to district)
  - Stage 1: Sampling of 60 Tier 2 units (equivalent of villages) using Probability Proportional to Size (PPS)
  - Stage 2: Sampling of 20 households in each Tier 2 unit using Simple Random Sampling
- they will be working in the following languages:

Sampled district (Country)	ICAN assessment tool language
Arusha Rural (Tanzania)	Kiswahili
Larde (Mozambique)	Portuguese
Mubende (Uganda)	English
Mwala (Kenya)	Kamba, English
Ikorodu (Nigeria)	English
Ségou (Mali)	French
Tivaouane (Senegal)	Wolof, French
Matagalpa (Nicaragua)	Spanish
Xalapa Rural (Mexico)	Spanish
Betul (India)	Hindi
Jhenaidah (Bangladesh)	Bangla
Makwanpur (Nepal)	Nepali
Toba Tek Singh (Pakistan)	Urdu

- The Tier 1 Unit will be sampled following any one of the 3 cases proposed in the sampling note:
    - Case 1: Citizen-led national assessment program available with estimates representative at the district level
    - Case 2: (Other) National level learning assessment program is available with estimates representative and available at the district level
    - Case 3: No learning level data at national and district level existing or data exits but is not available

*All members agreed on the following **village processes:***

- Volunteers will be trained and will be responsible for all in-village processes including
    - Making and/or updating the village map
    - Making and/or updating household lists
    - Sampling of households using village map or household list process
    - Completing the survey in sampled households

*All members agreed on the following **translation processes**:*

- Forward translation process will be used and documented for all ICAN material

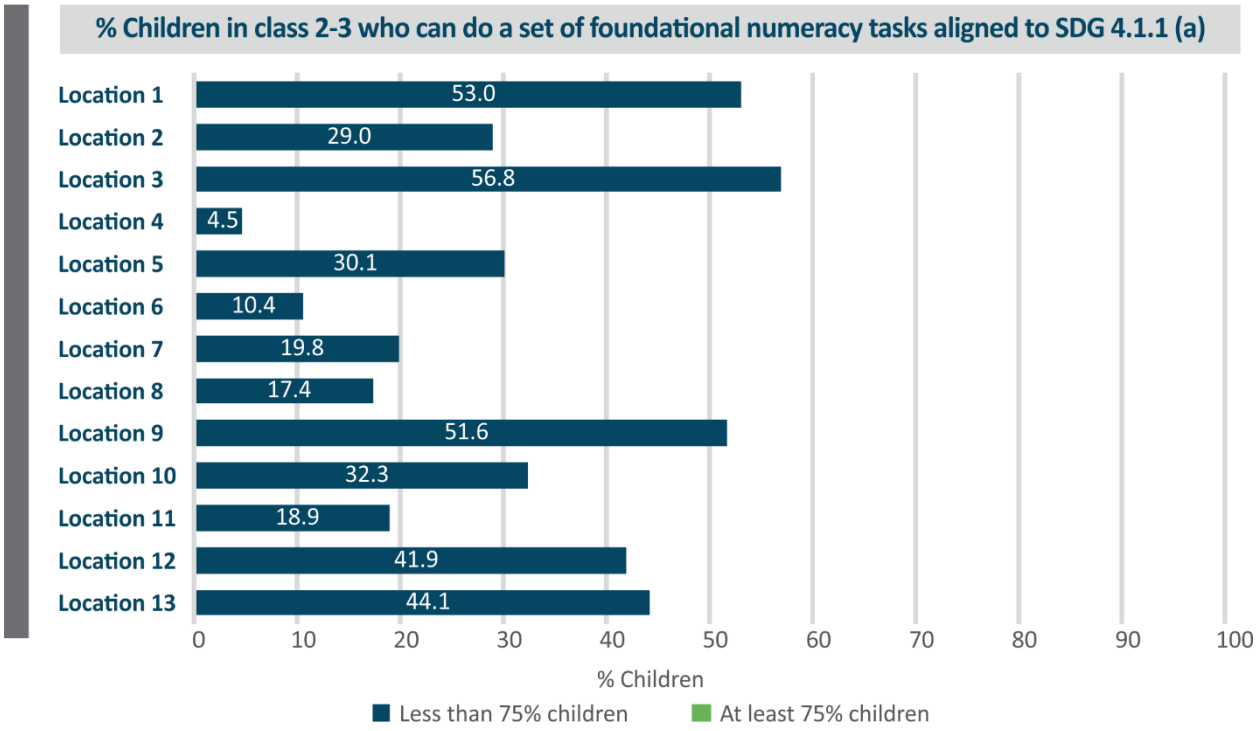
*All members agreed on the following **Monitoring and Recheck processes**:*

- That the quality of the assessment will be ensured through a stringent quality control process aligned to the PAL Network Data Quality Standards Framework (DQSF).
- The PMTs will be responsible to ensure documentation and sharing of quality control related information with the PAL Secretariat.

Appendix 6 - ICAN Report: Illustrative comparisons using ICAN 2019 data

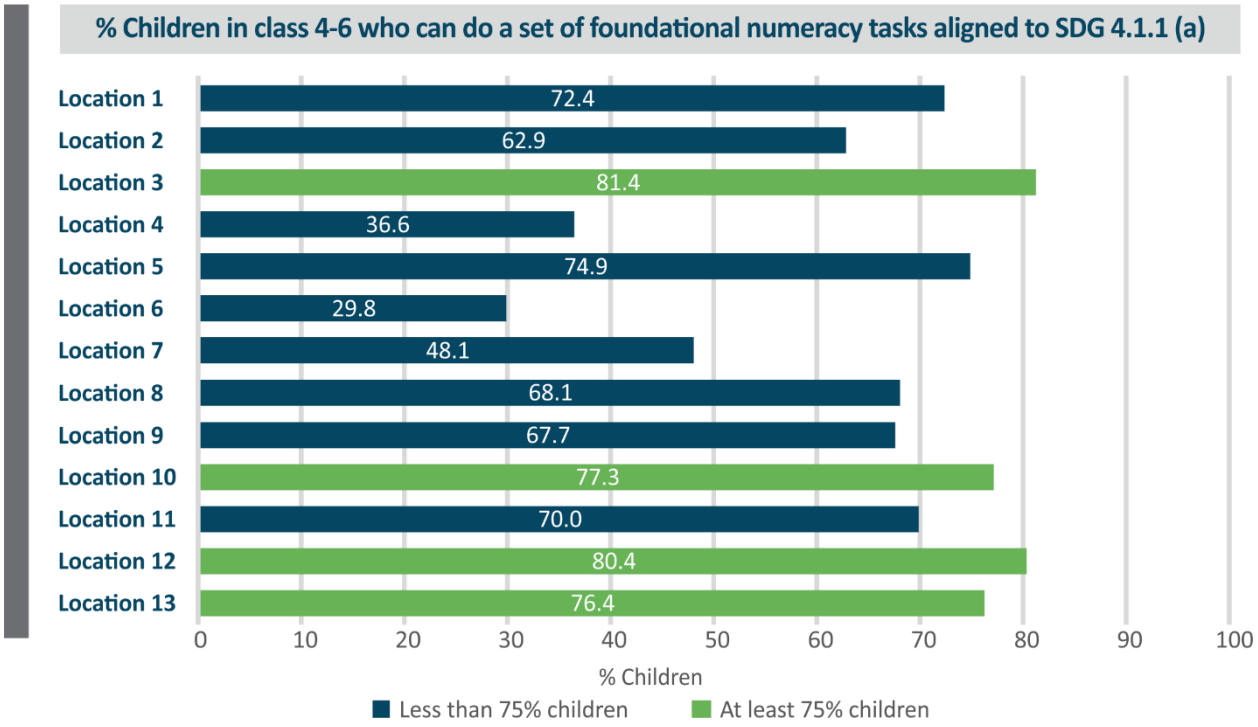
What proportion of children meet the SDG 4.1.1 (a) numeracy criteria for class 2 or 3?

Chart 1a



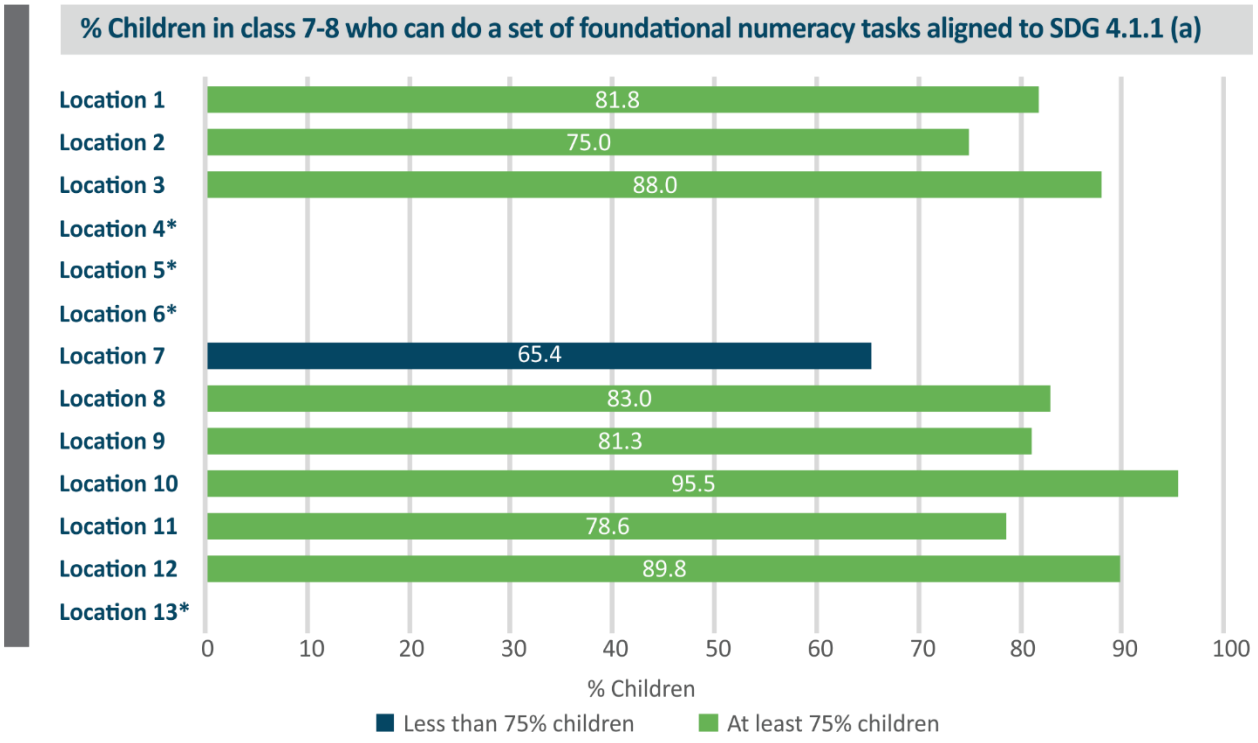
These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.

Chart 1b



These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.

Chart 1c



These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.

* Insufficient sample size

The minimum proficiency level descriptor for numeracy under SDG 4.1.1 (a) expects students to demonstrate skills in number sense and computation, shape recognition and spatial orientation in class 2 or 3.

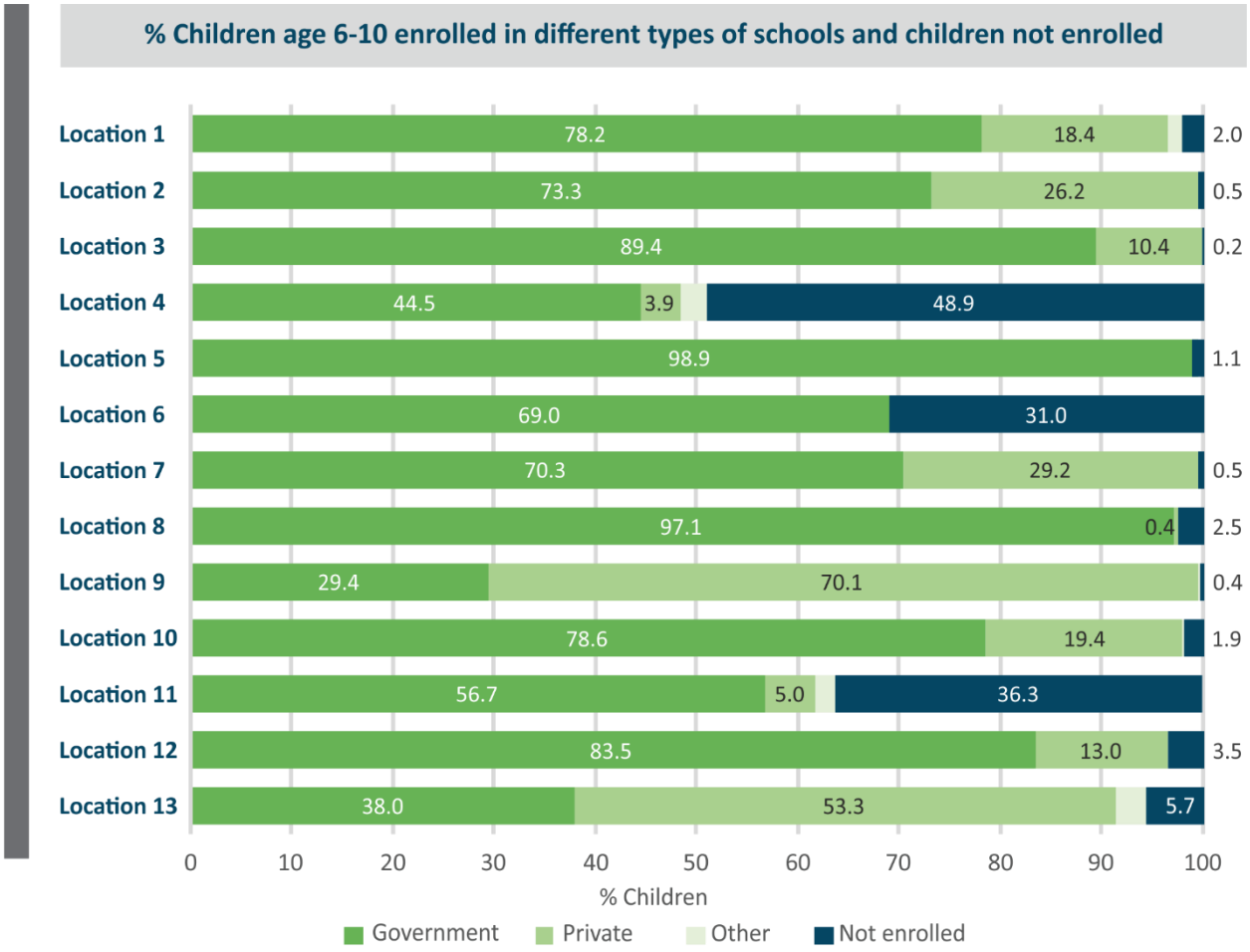
Chart 1 shows the proportion of children in class 2-3 (chart 1a), class 4-6 (chart 1b) and class 7-8 (chart 1c) who are able to do a set of foundational numeracy tasks that proxy the minimum proficiency level requirements for SDG 4.1.1 (a):

- At least 1 task each on spatial orientation, shape recognition, measurement, and number recognition; as well as
- At least 3 simple number operations.1

Charts 1a, 1b and 1c also identify the class group by when at least 75% children in a given location are able to do this set of tasks (green bars).

- In class 2-3, no location meets this criterion: the proportion of children who can do these tasks ranges from over 55% in Location 3 to only about 5% in Location 4.
- Even in class 4-6, only 4 locations meet the criterion: Location 3, Location 10, Location 12 and Location 13.
- In the 8 locations for which sufficient data is available, it is only by class 7-8 that all locations (except one, Location 7) meet the 75% criterion. But even in these classes, many children are still unable to do numeracy tasks expected in class 2 or 3.

Chart 2

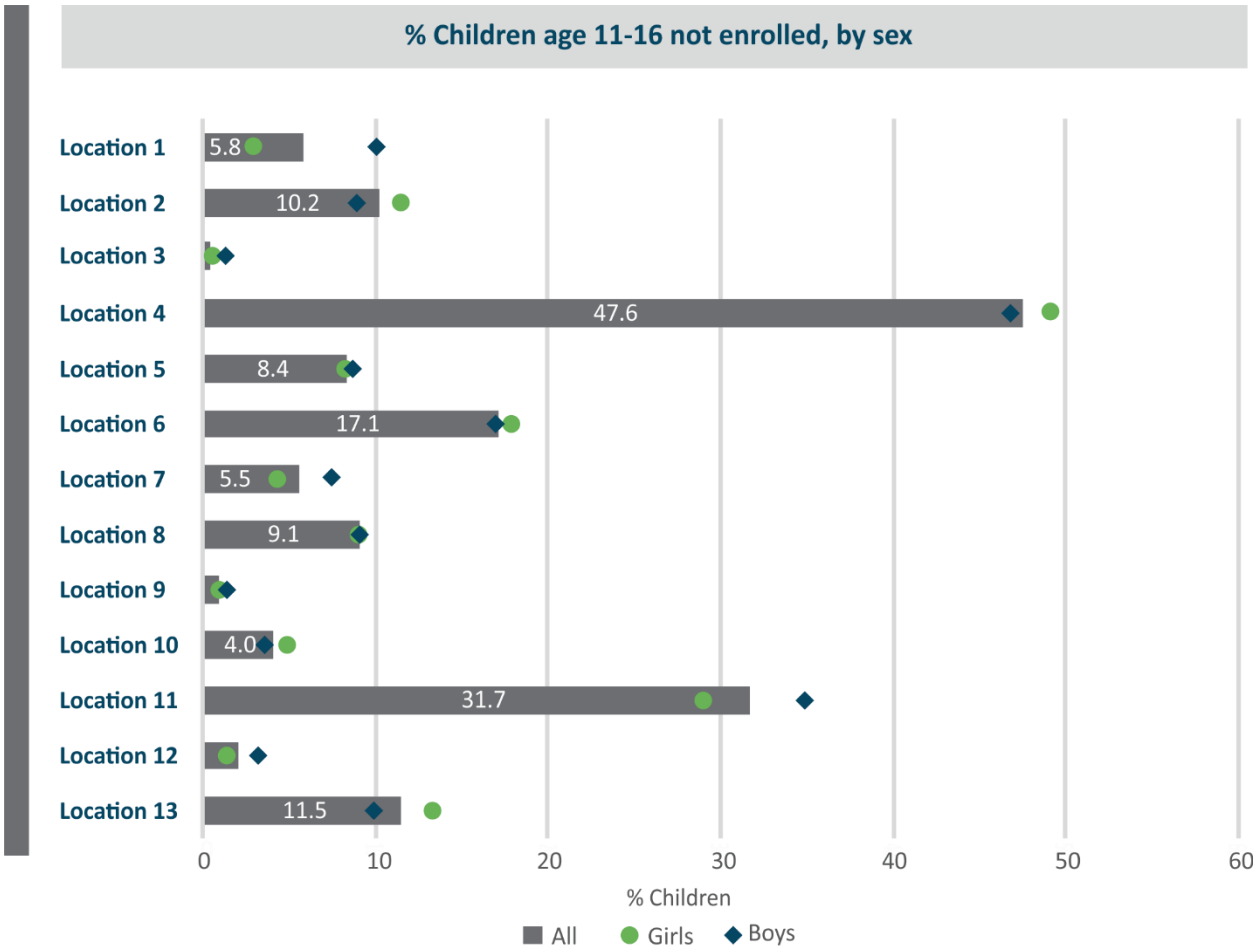


These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.

Adopted in the year 2000, the Millennium Development Goals (MDGs) created a push for universal access to education. Since then, there have been global and national efforts to expand school enrolments. Chart 2 explores enrolment patterns among children in the age group of 6-10 years, which is the primary school-going age group in most countries.

- Over 95% children in the age group of 6-10 years are enrolled in some type of school in most locations except Location 4, Location 6, Location 11 and Location 13.
- In Location 4, almost 50% children in this age group are out of school. This proportion is also large in Location 11 (over 35%) and in Location 6 (over 30%).
- In Location 9, 70% children are enrolled in private schools. This proportion is over 50% in Location 13 and around 30% in Location 7. In Location 5 and Location 8, on the other hand, almost all children in the age group of 6-10 years are enrolled in government schools.

Chart 3



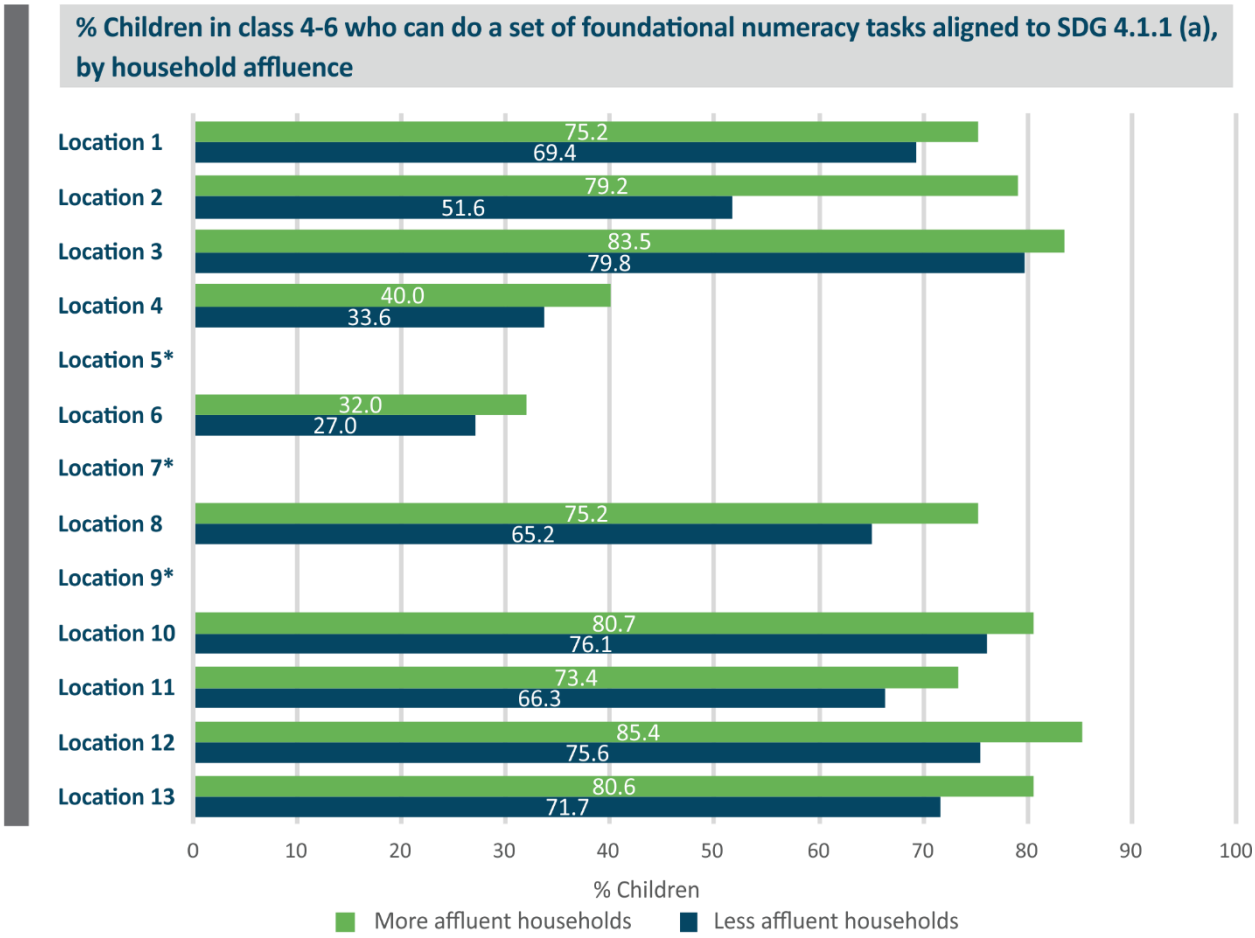
These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.

The ongoing COVID-19 pandemic will affect both the demand for and the supply of schooling. Adolescents and girls are likely to be the most affected.

Household-based implementation of ICAN on scale is useful to monitor enrolment patterns as well as foundational numeracy. Chart 3 explores the extent to which older children are out of school, and whether there are differences in this proportion by sex.

- In Location 3 and Location 9, very few children in this older age group are out of school.
- In Location 4, almost half of all children in the age group 11-16 years are not enrolled in school. In Location 11, this proportion is over 30%; and in Location 6, it is over 15%.
- In most locations, gender gaps in enrolment are small, except for Location 1 and Location 11 where there is a difference of more than 5 percentage points between boys and girls. In both cases there are more boys out of school than girls.

Chart 4

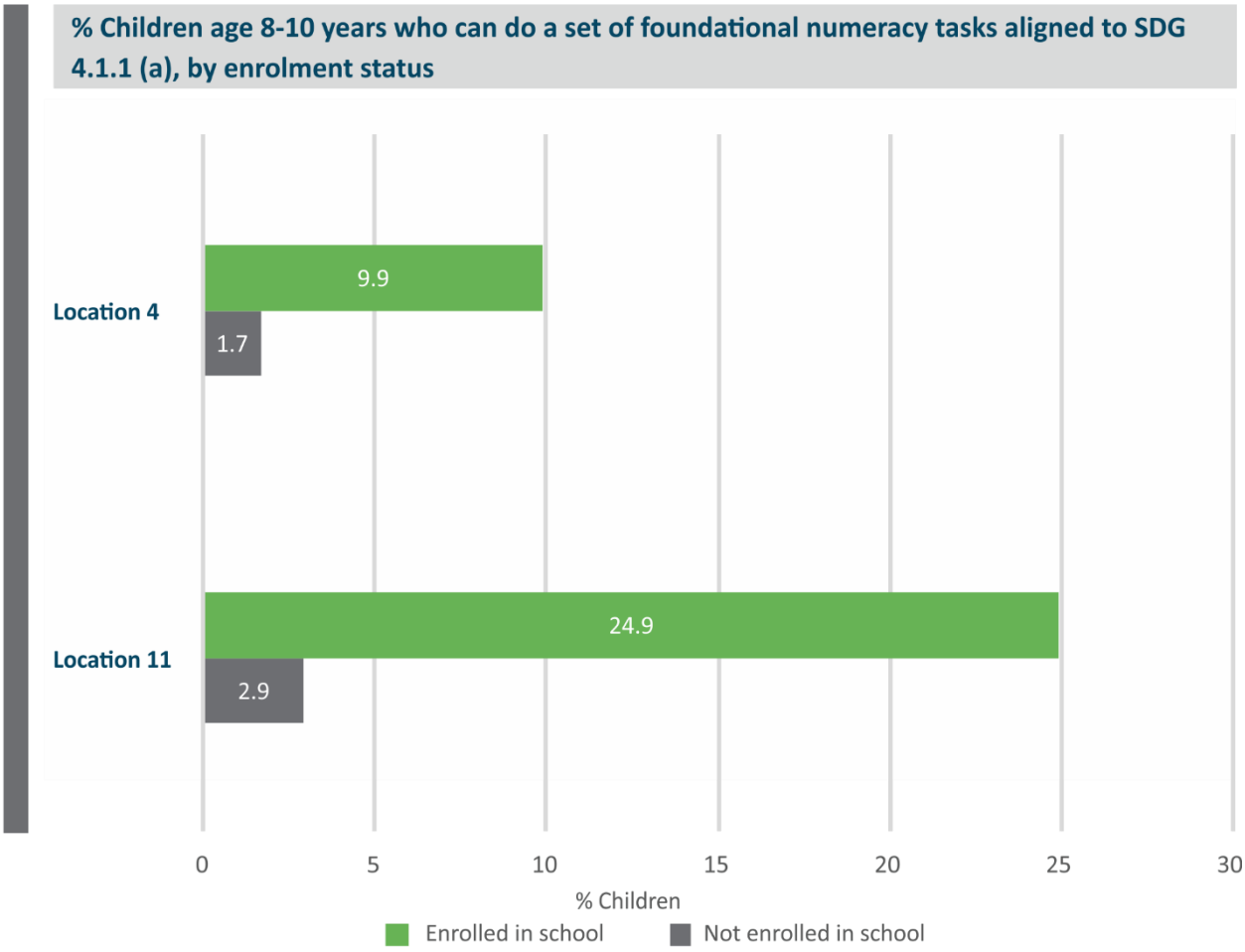


These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.
* Insufficient sample size

ICAN 2019 was conducted in households, enabling collection of information on selected facilities and assets in each sampled household. Chart 4 explores the disparities between children from more affluent and less affluent households in class 4-6 in terms of performance on foundational numeracy tasks aligned to the minimum proficiency criteria for SDG 4.1.1 (a). Affluence categories are based on household asset ownership.

- In all the locations for which sufficient data is available, except in Location 3 and Location 10, there is a gap of at least 5 percentage points in the proportion of children from less and more affluent households who are able to do this set of tasks. In all cases, children from more affluent households perform better.
- In Location 2, this gap is more than 25 percentage points, followed by almost 10 percentage points in Location 8 and Location 12.
- Even among class 4-6 children from more affluent households, large proportions are unable to do foundational numeracy tasks expected by class 2 or 3.

Chart 5



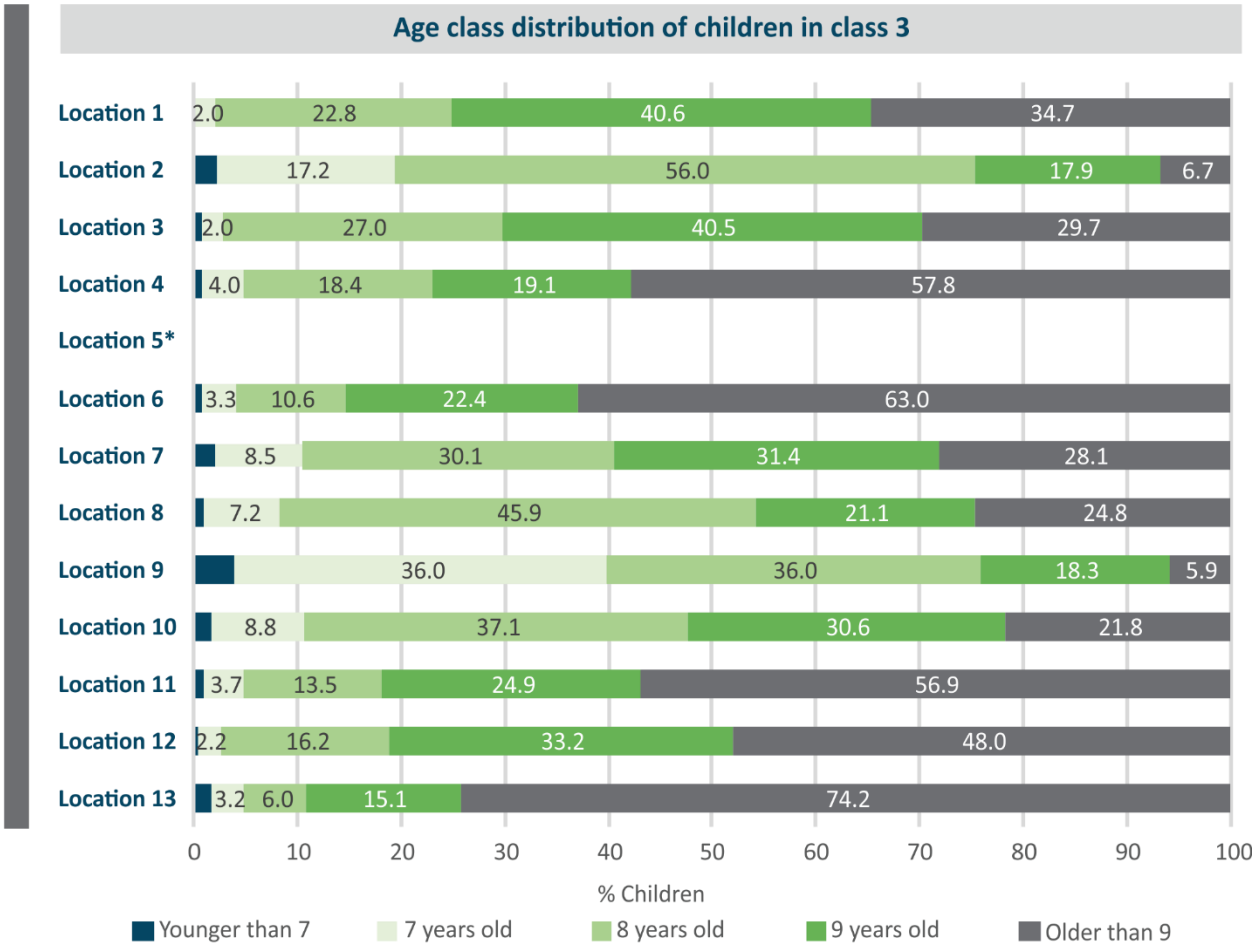
These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.

Because ICAN 2019 was administered in the households, it reached all children in the target age group of 5-16 years in sampled households, regardless of enrolment status. In Location 4 and Location 11 over 40% and 30% children, respectively in the age group of 8-10 years are not enrolled in school. For these two locations, chart 5 explores learning disparities between children who are enrolled and those who are not in terms of performance on foundational numeracy tasks aligned to the minimum proficiency requirements for SDG 4.1.1 (a).

- In Location 11, 25% of enrolled children in the age group 8-10 years can do foundational numeracy tasks. This proportion is 10% in Location 4.
- In both these locations, less than 3% children aged 8-10 years who are not enrolled in school can do foundational numeracy tasks. These out of school children need to be included in discussions on learning.

Chart 6

School curricula, teaching-learning materials, and teacher training are usually designed based on the assumption that children in a given class are of the same age. Wider age bands imply additional challenges for both teachers and learners. Chart 6 explores children's age distribution in class 3.



These are illustrative graphs. Because ICAN 2019 was conducted in only one district in each country, survey locations have been anonymised.
* Insufficient sample size

- Among the 12 locations for which sufficient data is available, there is no location where at least 75% of all children in class 3 are the same age.
- In location 7, for example, close to one in every three children is 8 years old, a similar proportion is 9 years old and almost as many are older than 9. But at the same time, one out of ten children is younger than 8.
- Locations vary enormously in age distribution. In location 9, for example, about three quarters of class 3 children are younger than 9 while in Location 13, the same proportion is older than 9.