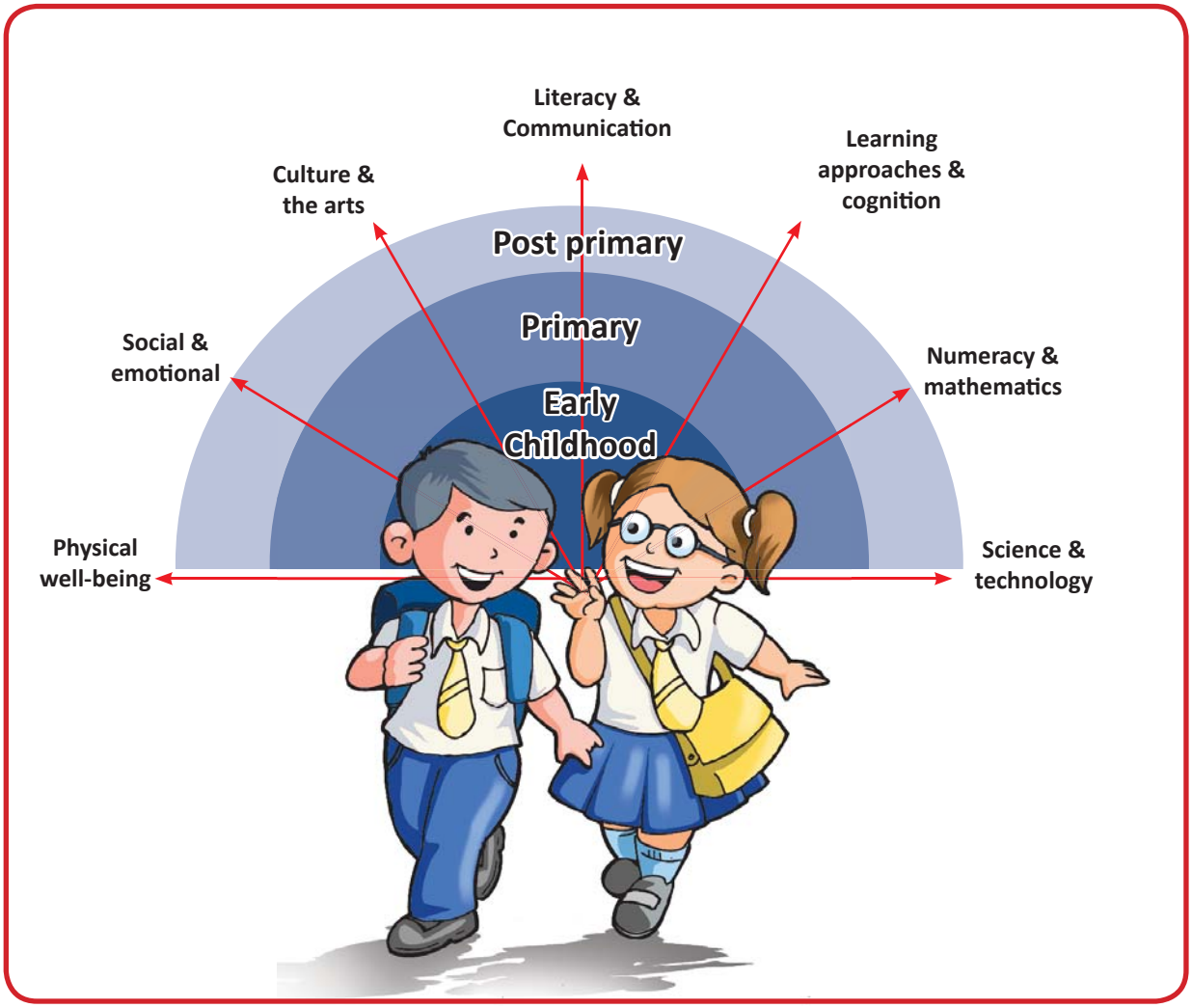
TOWARDS UNIVERSAL LEARNING



What Every Child Should Learn
A Global Framework for Measuring Learning
Implementing Assessment to Improve Learning
Recommendations from the Learning Metrics Task Force (LMTF)

A Concise Report of Various Reports of LMTF

March 2015

Prepared by Samunnat Nepal in coordination with Curriculum Development Centre and Supported by Unicef Nepal

Acknowledgement

This consolidated report on LMTF recommendations is the joint effort of many personnel for which Samunnat Nepal wishes to acknowledge their valuable contribution in the preparation of this report.

Samunnat Nepal would like to cordially thank Dr Bhojraj Sharma Kafle, Mr Mohan Gopal Nyachhyon and Mr Deergha Narayan Shrestha for their hard work and consistent efforts in understanding the core elements and consolidating three major reports published by the LMTF.

Samunnat Nepal would like to thank the Steering Committee members including Mr Diwakar Dhungel, Dr Bhojraj Sharma Kafle, Mr Rakesh Shrestha, Dr Sumon K Tuladhar and Ms Rosy Shakya for their technical input and suggestions. Special thanks goes to Mr Diwakar Dhungel from CDC for chairing the meetings and coordinating with the Nepal government.

Samunnat Nepal would like to acknowledge the prime role of UNICEF for supporting the work of the Learning Metrics Task Force (LMTF) and for providing us the opportunity to work on the recommendations of the LMTF for which this consolidated report has been prepared. Special thanks to Dr Sumon K Tuladhar for her continuous support in making all this possible.

Thanks to the LMTF Secretariat for providing us the series of Recommendation Reports.

Thanks to all those participants of the consultative meetings for providing their valuable suggestions and for the technical assistance from Mr Yubaraj Laudari and Mr Paban Adhikary.

Thanks to the board members and staff members of Samunnat Nepal for their support in shaping this report.

Samunnat Nepal

-fighting poverty for quality learning

About this report

This is the consolidated and summarized report based on the three major reports and a recommendation report published on various dates by the LMTF, viz *Towards Universal Learning – What Every Child Should Learn, February 2013; Towards Universal Learning – A Global Framework for Measuring Learning, July 2013; Towards Universal Learning – Implementing Assessments to improve Learning, June, 2013; Towards Universal Learning – Recommendations from the Learning Metrics Task Force, September 2013.*

Related information from the above reports have been abstracted and presented in this report as it is in the relevant chapters and is without our viewpoints. The explanatory and clarification notes and tables from the original report have been annexed in this report. We hope this report will give ample and precise view of the contents presented in the main reports. This will help the policymakers, educationists, researchers and other stakeholders working for education to be oriented on LMTF tasks and recommendations to align the post 2015 educational goals so that it reflects in our government policy and programs.

Acronyms and Abbreviations

CRC	Convention on the Rights of Children
CUE	Center for Universal Education
GEFI	Global Education First Initiative
GMR	Global Monitoring Report
LMTF	Learning Metrics Task Force
MDG	Millennium Development Goal
UIS	UNESCO Institute for Statistics
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund

Table of contents

List of figures and tables

Summary

Education is important for addressing current and future challenges of the nation, society and individual. It is also a gateway for exploring individual future opportunities. Over the past fifteen years, in the process of achieving the EFA and MDG goals, remarkable progress have been achieved in enrolling millions of children in schools worldwide. However, it has been estimated that nearly 250 million children have not been able to read, write and achieve the minimum learning standards despite having spent in school for at least four years.

Motivated by the challenges of low learning levels and a global data gap on learning, 30 organizations have joined efforts through the **Learning Metrics Task Force (LMTF)** with the ultimate goal to give tangible effect to EFA Goal 6 by catalyzing a shift in the education dialogue from *access to access plus learning* by building consensus on global learning indicators and actions to improve the measurement of learning in all countries. It aimed to make "learning" a central component of the post-2015 global development agenda and to make recommendations for common goals to improve learning opportunities and outcomes.

Convened by the UNESCO Institute for Statistics (UIS) and the Center for Universal Education (CUE) at the Brookings Institution, the task force works within the Millennium Development Goals (MDG), Education for All (EFA), and Global Education First Initiative (GEFI) and contributes to their fulfillment.

The purpose of the LMTF was to identify the answers to the three questions: What learning is important for all children and youth? How learning outcomes should be measured? and How can measurement of learning improve education quality? The task force technical working groups worked intensively through worldwide consultation and consequently forwarded Seven Recommendations:

Recommendation 1: A Global Paradigm Shift

The task force calls for a global shift in focus and investment from universal access to access *plus* learning.

Recommendation 2: Learning Competencies

The task force recommends that education systems offer opportunities for children and youth to master competencies in the seven domains: 1) Physical well being, 2) Social and emotional, 3) Cultural and the arts, 4) Literacy and communication, 5) Learning approaches and cognition, 6) Numeracy and mathematics, and 7) Science and technology.

The Global Framework of Learning Domains can and should apply to a wide range of settings where intentional learning takes place, including but not limited to formal schooling, community education systems and non-formal education programs.

Recommendation 3: Learning Indicators for Global Tracking

The task force recommends that the Learning indicators be tracked globally, proposing the seven areas of measurement: 1) Learning for all, 2) Age and education matter for learning, 3) Reading, 4) Numeracy, 5) Ready to learn, 6) Citizen of the world and 7) Breadth of learning opportunities.

The task force has mentioned that some indicators within these areas of measurement currently exist for all countries and entity, while others need to be developed. Countries and respective entity will need to debate, prioritize and take actions to determine precisely what they will measure in relation to their specific goals and needs.

Recommendation 4: Supporting Countries

Countries are supported in strengthening their assessment systems and, ultimately, in improving learning levels. The task force has recommended the need of support in three areas: Technical expertise, Institutional capacity and Political will to improve learning measurement and outcomes for the quality education.

Recommendation 5: Equity

Measurement of learning must include an explicit focus on equity, with particular attention to inequalities within countries. The task force recommends that the measures of access and learning, along with data on child characteristics, should be used to ensure equitable learning opportunities (shaped by a range of factors such as school conditions, teacher quality, etc.) and to reduce disparities in learning outcomes.

Recommendation 6: Assessment as a Public Good

Measures for globally tracked indicators must be a public good, with tools, documentation and data made freely available. Donors and the private sector should help eliminate cost barriers to assessment, especially in low and middle-income countries. Documentation should include data sets, instruments and procedures used to generate data. Full documentation of studies that are funded with public resources should be made widely available to ensure transparency and reproducibility of results.

Recommendation 7: Taking Action

Stakeholders must take action to ensure the right to learn for all children and youth. The task force calls for coordinated action by all education and development actors across the globe to make improvements of learning a global priority and a series of next steps to help carry task force recommendations forward into action.

(A Global Framework for Measuring Learning for Post 2015)

I. Introduction: Why Learning Metrics?

Education has become an unfinished global agenda on development of all countries; specifically it has become more crucial for the developing countries as they are committed to the Education for All (EFA) Goals and Millennium Development Goal (MDG) by 2015. Education is key for the development of an individual and nation. Remarkable progresses have been achieved in enrollment rates over the past 15 years. However, *EFA Global Monitoring Report 2012* estimated that still about **250 million primary school-age children around the world including those who have spent at least four years in school are not able to read, write or count well enough to meet minimum learning standards and 200 million adolescents, including those who complete secondary school, do not have the skills they need for life and employment**. Moreover, the learning level of children remains unacceptably low. Poor quality education is jeopardizing the future of millions of children and youth around the world. Yet, we do not know the full scale of the crisis because measurement of learning outcomes is limited and difficult to assess at the global level.

Because, many countries lack sufficient data and capacity to systematically measure and track learning outcomes over time, it has been also found that too many children drop their schools without getting the minimum skills and learning needs. The aim of enrolling children in schools should be learning and not just schooling.

Considering the existing issues and the importance of learning for quality and access to education, a Learning Metrics Task Force (LMTF) was formed in the beginning of July 2012 with representatives of 30 member organizations from national and regional governments, EFA-convening agencies, regional political bodies, civil society, and donor agencies and convened by UNESCO, through its Institute for Statistics (UIS), and the Center for Universal Education (CUE) at the Brookings Institution.

The purpose of the LMTF was to improve the learning experiences of children and youth around the world. For this the taskforce had set its work within the EFA, MDG and GEFI goals to contribute by catalyzing a shift in the global conversation on education from a focus on access to access *plus* learning and hence building consensus on global learning indicators and actions to improve the measurement of learning in all countries.

For this purpose, the following three specific issues were identified by LMTF to focus on:

1. **Standards: What learning is important for all children and youth?**
2. **Measures and Methods: How learning outcomes should be measured?**
3. **Implementation: How can measurement of learning be implemented to improve education quality?**

To address the above issues, the LMTF working groups consisting of 186 technical working group members in three groups, had consultations at the global level with wider participation of more than 1700 government, educationists, various national and international organizations and other key stakeholders from 118 countries. The task force technical working groups worked for over the past 18 months.

Policies and Global Dialogues documents like UN Convention on the Rights of the Child (CRC) (1989), the DeLors Report (1996), EFA Goal (2000), Rio +20 report - the Future We Want (2012), GPE Indicators (2012) and the report regarding Education First (2012) and the international research reports were also reviewed more comprehensively for the LMTF's stated purpose.

LMTF's work was accomplished in three phases relating to the above-mentioned three issues consequently producing three separate reports. This is the consolidated and summarized report based on all those three reports. Information from the three consecutive reports have been abstracted and presented in this report in the successive chapters.

II. What Learning is Important for All Children and Youth?

This section briefly presents a broad, holistic framework of learning domains and sub-domains, which the Task Force has developed as the aspiration for all children and youth globally for the three stages of schooling starting from early childhood through primary and post-primary levels. Please check Table 1 and 2 for the learning outcomes related to seven domains and sub-domains of learning across these three stages.

The LMTF, when developing this framework had noted several considerations for various populations and contexts related to these seven domains which needs specific interventions. They were: children with disabilities, gender, conflict and emergencies and countries with low levels of learning.

Even though it was a challenge to define learning outcomes, which are important to all, at the global level in the existing variations of contexts/situations, this holistic framework of seven learning domains was developed based on (i) existing global policies and dialogues (ii) researches supporting the importance of learning in these domains for different areas of people's lives, including economic growth and material prosperity, and (iii) results from global consultations with the education community.

A graphical representation of the seven learning domains is presented in the figure 1 as shown below:

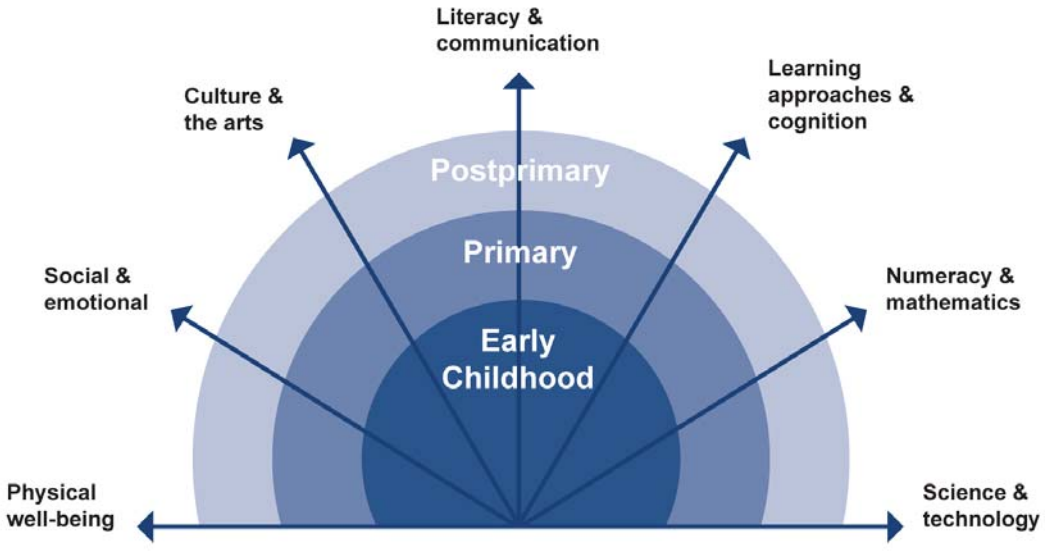


Figure 1: Global Framework of Learning Domains

The arrows in the above figure represent the domains of learning extending outwards as a child expands her/his development or competency in a given area as per her/his age, and level. The arrows extending outwards beyond the diagram indicate that an individual may continue learning more deeply in a given area at the upper levels of education or through non-formal learning opportunities.

The table below presents the areas under sub-domains corresponding to each of the seven domains with descriptions, applicable from early childhood through post-primary level of schooling, as identified by the LMTF keeping in view that some domains are more relevant at different learning stages.

Table 1: Description of the learning domains

Domains / Description	Physical well-being	Social and emotional	Culture and the arts	Literacy and communication	Learning approaches and cognition	Numeracy and mathematics	Science and technology
Details	How children and youth use their bodies, develop motor control, and understand and exhibit appropriate nutrition, exercise, hygiene and safety practices.	How children and youth foster and maintain relation-ships with adults and peers. Also, how they perceive themselves in relation to others.	Creative expression, including activities from the areas of music, theater, dance or creative movement, and the visual, media and literary arts. Also, cultural experi-ences in families, school, community and country.	Commu-nication in the primary language(s) of the society in which children and youth live, including speaking, listening, reading, writing, and under-standing the spoken and written word in various media.	Learning approaches describe a learner's engagement, motivation and participation in learning. Cognition is the mental process of acquiring learning through these various approaches.	The science of numbers and quantitative languages used uni-versally to represent phenomena observed in the environment.	Science is specific knowledge or a body or system of knowledge covering physical laws and general truths. Technology refers to the creation and usage of tools to solve problems.

Table 2: Domains and Sub-domains of the Global Learning Domains Framework

Domain / Stages	Physical well-being	Social and emotional	Culture and the arts	Literacy and communication	Learning approaches and cognition	Numeracy and mathematics	Science and technology
Early Childhood Level	• Physical health and nutrition • Health knowledge and practice • Safety knowledge and practice • Gross, fine, and perceptual motor.	• Self-regulation • Emotional awareness • Self-concept and self-efficacy • Empathy • Social relationships and behaviors • Conflict resolution • Moral values	• Creative arts • Self- and communi-ty-identity • Awareness of and respect for diversity	• Receptive language • Expressive language • Vocabulary • Print awareness	• Curiosity and engagement • Persistence and attention • Autonomy and initiative • Cooperation • Creativity • Reasoning and problem solving • Early critical thinking skills • Symbolic representation	• Number sense and operations • Spatial sense and geometry • Patterns and classification • Measurement and comparison	• Inquiry skills • Awareness of the natural and physical world • Technology awareness
Primary Level	• Physical health and hygiene • Food and nutrition • Physical activity • Sexual health	• Social and community values • Civic values • Mental health and well-being	• Creative arts • Cultural knowledge	• Oral fluency • Oral comprehension • Reading fluency • Reading comprehension • Receptive vocabulary • Expressive vocabulary • Written expression/ composition	• Persistence and attention • Cooperation • Autonomy • Knowledge • Comprehension • Application • Critical thinking	• Number concepts and operations • Geometry and patterns • Mathematics application	• Scientific inquiry • Life science • Physical science • Earth science • Awareness and use of digital technology
Post-primary Level	• Health and hygiene • Sexual and reproductive health • Illness and disease prevention	• Social awareness • Leadership • Civic engagement • Positive view of self and others • Resilience/“grit” • Moral and ethical values • Social sciences	• Creative arts • Cultural studies	• Speaking and listening • Writing • Reading	• Collaboration • Self-direction • Learning orientation • Persistence • Problem Solving • Critical decision making • Flexibility • Creativity	• Number • Algebra • Geometry • Everyday calculations • Personal finance • Informed consumer • Data and statistics	• Biology • Chemistry • Physics • Earth science • Scientific approaches • Environmental awareness • Digital learning

Note: Full list of sub-domains as per the Domains across each level of schooling is in the Appendix

Additional information on learning domains: The task force has provided the following important points regarding the above learning domains and sub-domains:

- The domains and sub-domains mentioned above are common for all the children over the globe; however, the place and situation specific learning need and domain might be different.
- Learning for children with disabilities, gender-wise difference, and conflict and emergency situation need separate and specific efforts.
- Uniform and standard indicators are needed to measure the common (above mentioned seven domains and sub-domains) as well as for the situational (place specific, disabilities, gender, and conflict and emergency) learning domains and sub-domains.

III. How Learning Outcomes should be measured?

Measurement of learning plays a crucial role in improving education quality and learning. Measurement may have different purposes at different levels – at the classroom level for improvement in the instructional process; at the school and community level for targeting resources and improving school quality; at the national level for diagnosing overall status of the national education system and developing policies to improve learning outcomes, development agencies use data for measuring the effectiveness of the programming and advocate effective education policies and practices.

Although different approaches to measurement are useful for different purposes, the systems for measuring and improving learning at the classroom, national, and global levels should not be working in isolation. Globally tracked indicators should be aligned with what is measured nationally and in schools or classrooms, while measurement at the national level should be aligned with the competencies measured in classrooms or schools.

The LMTF acknowledges that the different domains require varying degrees of effort to develop suitable measures at the national and international levels. Additionally, some domains might only be emphasized within specific national policy strategies in light of particular national conditions e.g. HIV/AIDS, conflicts. The LMTF framework is structured to promote access plus learning. While the focus is primarily on learning, access is included in the framework so that millions of children still out of school are not excluded. For this reason, in addition to learning, global goals and measures have been combined with the expectations regarding access and completion.

The task force recommends a small set of learning indicators to be tracked globally (meaning in all countries). These indicators measure fundamental learning opportunities over a child's educational career. They were chosen based on an extensive review of existing measures and an effort to address all domains of learning while presenting a framework that is feasible for all countries.

Some indicators within these areas of measurement currently exist for all countries and entity, while others need to be developed. Countries and respective entity will need to debate, prioritize and take action to determine precisely what they will measure in relation to their specific goals and needs.

Presented below is the table with the seven areas of measurement and description of indicators linked to each of the areas of measurements aside identified by the task force, together with the corresponding actions proposed.

Table 3: Learning Indicators for Global Tracking

S.N.	Areas of Measurement	Description of Indicators	Proposed Actions
1	Learning for all	Combine measures of completion and learning (reading proficiency at the end of primary school) into one indicator.	• Develop a set of guidelines to improve data collection procedures and standards to report on progression and completion. • Consider new approaches aimed at measuring children's opportunities to learn in school in order to better understand the quality of education provision. • Consider new research on the measurement of access to and completion of non-formal education programs, where they are equivalent to formal schooling and are aimed at children of primary school age.
2	Age and education matter for learning	Measure timely entry, progression, and completion of schooling, and population based indicators to capture those who do not enter or leave school early.	
3	Reading	Measure foundation skills by Grade 3 and proficiency by the end of primary school.	• Develop guidelines for the characteristics of assessment to be used for tracking outcomes globally. • Ensure that characteristics regarding the design of assessments are transparent and accessible. • Convene a group of experts to review and set standards for measures of reading in order to develop guidelines. • Explore the feasibility of linking across existing cross-national assessments, including those that are household-based.
4	Numeracy	Measure basic skills by end of primary and proficiency by lower secondary school.	• Define the process for reporting on indicators of proficiency in numeracy and mathematics, developing guidelines for the characteristics of assessments to be used, and initiating the tracking of data across countries at the lower secondary level. • Convene a group of experts to review and set standards for measures of numeracy and mathematics in order to define the process.
5	Ready to learn	Measure acceptable levels of early learning and development across a subset of domains by the time a child enters primary school.	• Link measurement with other sectors such as health and child protection to develop indicators on early childhood readiness. • Review and identify a small set of population-based measures for early learning and development that can be used globally.
6	Citizen of the world	Measure among youth the demonstration of values and skills necessary for success in their communities, countries and the world	• Conduct a consultation involving youth and youth organizations along with experts and other important stakeholders to reach a consensus on what it means to be a citizen of the world, and how the values and skills embedded in the definition can be measured and tracked globally. • Collaborate with other organizations that are already making progress in measuring and defining 21st century skills and global citizenship values. • Consider the intended curriculum when defining these skills and values, linking development of measures to the process for Breadth of Learning Opportunities.

7	Breadth of learning opportunities	Track exposure to learning opportunities across all seven domains of learning	• Undertake desk research to understand the extent to which all domains of learning are reflected in national curricula, teacher training and assessments. • Develop a simple measure to track the breadth of learning opportunities at the global level. • Develop a self-diagnostic tool kit, which would allow countries to assess the specific domains and subdomains that are most relevant for their context. • Collaborate with other organizations already working on mapping curricula by learning subdomains.

LMTF has recognized the following points that need to be considered while learning is being measured:

- It is important to ensure that learning is measured and improved in an equitable way. So, information collected and reported within these areas should describe progress over time and across population groups in addition to average achievement levels in a country or region. It is vital to collect and disaggregate data on sex, urban/rural location, and family socio-economic status in order to target improvements that reach the most marginalized children and youth.
- Multiple methods should be considered when designing systems to assess learning opportunities and outcomes. This includes standardized assessments, internationally comparable assessments, national exams and assessments, and household-based surveys that measure the learning levels of out of school children as well.
- One of the main focuses of the task force is to collectively define global ambition on improving learning and propose practical actions to deliver and measure progress. So the areas of learning endorsed by the LMTF should be tracked by the global education community regardless of their incorporation into post-2015 global development goals.
- Countries must be supported for financial, technical and political resources to measure learning and use the information to improve learning outcomes.

The task force has recognized that **a system of global measurement would only be effective in improving learning outcomes if there is a strong commitment to improve national and classroom-level assessment.**

IV. How Can Measurement of Learning be implemented to Improve Education Quality?

Figure 3: Three Key supports for a strong learning measurement system.

This section briefs the major points, which the taskforce has presented describing the key supports countries need to develop and sustain robust assessments of learning that can help inform improvements in policy and practice – implementation of measurement of learning to improve education quality. Quality education and learning are the responsibilities of multiple stakeholder groups, including governments, civil society and the private sector. An effective and efficient measurement system plays a vital role in quality education. In order to implement an assessment system that is both country-owned and internationally relevant, countries and other governmental units can benefit from collaboration, sharing and support. For this to happen, the task force has identified three key supports that are necessary for a successful learning measurement system that are in high demand worldwide which includes Technical expertise, Institutional capacity, and Political will.

Technical Expertise

Countries need technical tools and expertise to carry out quality learning assessments. A significant amount of developmental work involving multiple actors is required to generate and pilot the tools needed for countries to start tracking progress in the areas identified by the LMTF. Additionally, countries need technical experts from within their education systems to implement large-scale assessments and provide guidelines for formative assessments.

The LMTF noted following four points that the countries must meet in order to ensure that assessments accurately reflect student achievement and serve the needs of users:

- The assessment has enough items to comprehensively assess the knowledge and skills within a given domain.
- The assessment measures knowledge and skills at an appropriate level for the students taking it (i.e., it is neither too difficult nor too easy for the majority of students).
- The assessment's ability to measure knowledge in one domain should not depend on students' abilities in other domains, which is especially important for students who are tested in a language other than the one they primarily use.
- The assessment instruments are designed so that comparison over time is possible.

LMTF has suggested the following points that can be used as guidelines to generate the questions to diagnose the technical needs of the assessment system: Breadth of learning domains to be assessed; Educational stages and populations to be assessed, Quality of formative assessments; Quality of summative assessments; Quality of examinations and Human resources. *The detailed table on "Guiding Questions for countries: Technical" is in annex A.*

In relation to strengthening of the technical expertise of countries, the task force has recommended the need of global-level support for the following programs:

- Develop agreed-upon indicators in seven areas of measurement: LMTF partner organizations will work together in the next phase to develop indicators in the seven areas of measurement
- Develop new measures and/or tools with consultative input: LMTF partners are in a position to use the new measures and/or tools through coordination and making actors accountable.
- Set up quality assurance mechanisms to evaluate tools and data: In order to ensure quality of the tools and the data, partners should work together on methodological development, sharing lessons learnt and implementing global measures as well as adapting measures to national contexts.

Institutional Capacity

Parallel to the technical work, governments and other stakeholders involved in measuring learning must develop strong institutional capacity to build and sustain robust systems for measuring learning. This includes various assessment structures like national and local multi-stakeholder steering committees, regional and national assessment institutions that act as a channel of communication between key educational stakeholders and can identify and address policy questions, resolve administrative and financial problems, if any, and communicate findings that address possible negative reactions.

LMTF has suggested the following points that can be used as guidelines to generate the questions to diagnose the institutional needs of the assessment system: Alignment of assessment with curriculum; Institutional capacity for assessment; Multi-stakeholder decision making; Coordination of assessment efforts.

The task force has recommended the need of global-level support by identifying the following ways forward to implement the recommendations of the LMTF:

- Countries drive change (country-owned and country-driven) : Each country should begin with an assessment of the current learning measurement system including a menu of options for national-level support.
- Build on the existing efforts: Implementation should be carried out based on existing efforts by national, regional and international organizations in a culturally relevant way.
- Proceed through inclusive dialogue, including through national steering committees and/or communities of practice on assessment: These committees should include teacher organizations, parents, students and civil society organizations, academia and private sector stakeholders in addition to national education ministry participants.
- Demonstrate commitment: Interested countries should demonstrate commitment through political support and cost sharing.

The detailed table on "Guiding Questions for countries: Institutional" is in annex B.

Political Will

In order to develop and sustain efforts to improve learning, there must be strong political commitment and will to invest in learning measurement and translate the data into action. Political support for assessment that is used to improve learning is important at all levels including at the school, district, national and global levels. Political will to measure learning in a transparent way is only the first step in improving learning. The lack of political will to implement the findings of assessment was cited as a major barrier to improving learning. In addition, assessments are often associated with grades/ marks or for the passage to the next grade or level. Politicians and decision makers need to understand what role assessments can play in improving the quality of education and learning to support the development of new tools and increase investments in assessments. Many assessment initiatives have recommended various intervention measures and indicated for a review of curriculum. The SABER-Students Assessment and UNESCO GEQAF have been recommended to diagnose the various political aspects of a country assessment system: Public awareness and demand; Political will of government to assess and share results and Policy effects of assessments.

The task force has recommended the need of global-level support for the following actions that are needed to garner political support for measurement:

- Encourage political support at the national level
- Promote focus on learning at the global level
- Engage civil society in a grass roots movement to measure and improve learning
- Garner financial resources

The detailed table on "Guiding Questions for countries: Political" is in annex C.

V. LMTF Recommendations in brief

By highlighting the shockingly poor learning outcomes achieved in many countries, despite remarkable progress in enrollment rates over the past years, the LMTF brought a wide range of education stakeholders together and made the following seven recommendations:

The first recommendation has pointed about Global Paradigm Shift which is shift in focus and investment from universal access to access *plus* learning. With a new set of international development goals on the post-2015 horizon, this paradigm shift is urgently needed to ensure that all children and youth have the opportunity to attain a high quality education that will enable them to develop the skills and competencies required for success in their future lives and livelihoods.

The second recommendation has dealt with Learning Competencies with details of seven domains of learning and pointed that education systems offer opportunities for the children and youth to master competencies across these seven domains of learning that are essential as they prepare them for their future lives and livelihoods. The seven domains of learning, starting from early childhood to post-primary include 1) Physical well being, 2) Social and emotional, 3) Cultural and the arts, 4) Literacy and communication, 5) Learning approaches and cognition, 6) Numeracy and mathematics, and 7) Science and technology.

The task force also recommends that there should be place and situation specific interventions to improve learning of children with disabilities, gender, and those suffering from conflict and emergencies. Moreover, The Global Framework of Learning Domains can and should apply to the wide range of settings where intentional learning takes place, including but not limited to formal schooling, community education systems and non-formal education programs.

The third recommendation has focused on Learning Indicators for Global Tracking proposing a small set of learning indicators to be tracked globally (meaning in all countries), to deal with the question how learning outcomes should be measured? These indicators measure fundamental learning opportunities over a child's educational career. They were chosen based on an extensive review of existing measures and an effort to address all domains of learning while presenting a framework that is feasible for all countries.

The seven areas of measurements, which the task force has proposed are: 1) Learning for all, 2) Age and education matter for learning, 3) Reading, 4) Numeracy, 5) Ready to learn, 6) Citizen of the world, and 7) Breadth of learning opportunities. And, the task force has mentioned that some indicators within these areas of measurement currently exist for all countries and entity, while others need to be developed. Countries and respective entity will need to debate, prioritize and take action to determine precisely what they will measure in relation to their specific goals and needs.

The fourth recommendation has emphasized on Supporting Countries pointing that countries are supported in strengthening their assessment and ultimately in improving learning levels to address how can measurement of learning improve education quality? LMTF Task Force has recommended that countries lead, with the support of regional and international actors, a process to: diagnose the quality of their assessment systems; convene stakeholders; and assess the necessary technical and financial resources required to improve learning measurement and outcomes. And, has recommended that a multi-stakeholder collaboration be developed to do this. The task force has pointed for the need of support in three areas: Technical expertise, Institutional capacity and Political will to translate task force recommendations into action.

1) Technical support is needed for many countries to move forward on agreed-upon learning measures for global tracking, to develop new learning measures for tracking within and across countries through an inclusive and consultative process and to set up quality assurance mechanisms to evaluate tools.

2) Institutional support is needed to develop tools for self-diagnosis of strengths and weaknesses of current assessment systems, to support communities for practice, and to promote sharing of expertise, lessons learned and examples of effective practices.

3) Political support is needed to promote a culture of measurement and effective use of assessment data, to promote a shift in focus from access to access *plus* learning, to engage civil society in a grassroots movement to measure and improve learning, and to mobilize financial resources for this work.

The fifth recommendation has focused on Equity pointing that measurement of learning must include an explicit focus on equity, with particular attention to inequalities, within countries. Measures of access and learning, along with data on child characteristics, should be used to ensure equitable learning opportunities (shaped by a range of factors such as school conditions, teacher quality, etc.) and to reduce disparities in learning outcomes. This requires an understanding of the characteristics of out of school children and youth and the barriers they face, as well as explicit efforts to identify those children who are furthest behind and put in place strategies to accelerate their progress.

Recommendation sixth focused on Assessment as a Public Good stressing that measures for globally tracked indicators must be a public good, with tools, documentation and data made freely available. The task force recommends that Donors and the private sector should help eliminate cost barriers to assessment, especially in low-and middle-income countries especially, for the indicators to be tracked at the global level. Documentation should include data sets, instruments and procedures used to generate the data. Full documentation of studies that are funded with public resources should be made widely available to ensure the transparency and reproducibility of results. The body responsible for conducting the studies must have the independence to make technical decisions on what is publishable.

The last and seventh recommendation has noted about Taking Action highlighting the necessity of stakeholders taking action to ensure the right to learn for all children and youth. For this the task force calls for coordinated action by all education and development actors to make improvements in learning outcomes and measurement of learning a global priority, and proposes for the education community to sustain this momentum and offer a series of next steps to help carry task force recommendations forward into action.

With these recommendations, the Learning Metrics Task Force sets forth an ambitious agenda for leveraging assessments to improve learning opportunities and outcomes for all children and youth. The lessons learned from the work of the task force will be invaluable to post- 2015 decision makers and ministries of education as they prepare to make the paradigm shift from access to access plus learning within their own systems. Such effort can ultimately help to add value on access plus quality of education during post 2015. And, last but not the least, the most effective solutions to address the quality education will vary by context, place and country, but the commitment to learning must be constant and unwavering.

Full list of sub-domains as per the Domains across each level of schooling

1. Physical Well-being

This domain refers to the knowledge that individuals need to learn to ensure their own health and well-being, as well as that of their families and communities. It also describes the ways children and youths use their bodies, develop motor control, and understand and exhibit appropriate nutrition, exercise, hygiene and safety practices.

(a) Early Childhood Level

It has been found that children suffering from malnutrition early in life do not achieve learning outcomes as they should and as envisaged, and they don't develop necessary motor skills in early childhood, which are significant predictors of achievement in primary school. The outcomes related to this domain, although are not learning outcomes as such, but they are considered as developmental outcomes, which are important for the well-being and predictors of later ability.

Subdomains of the Physical Well-Being Domain for Early Childhood	
Subdomains	**Description**
Physical health and nutrition	Physical health and nutritional status can be considered more a developmental domain than a learning domain. It refers to children being free from disease and adequately nourished, and may refer to understanding the dangers and benefits of specific foods.
Health knowledge and practice	Health knowledge and practice refers to habits related to health and hygiene as appropriate to the child's context, including elimination (toileting), eating, hand washing and brushing teeth.
Safety knowledge and practice	For young children, safety refers to their ability to recognize and avoid threats in the environment. This varies widely by context, but includes recognizing threats related to conflict, roads, water, animals, strangers, etc.
Gross, fine and perceptual motor skills	Gross motor skills are large movements of the body used in activities such as running, jumping, crawling and climbing. Fine motor skills are small movements used in activities, such as picking up and manipulating objects, drawing, writing and using a keyboard. Perceptual motor skills are related to how the brain, eyes and body work together (e.g., hand-eye coordination).

(b) Primary Level

It is a well-accepted fact that good health habits established early in life last throughout the lifetime. And, also it has been observed that a holistic approach to health, which is integrated into multiple topics are more effective in achieving measurable health and behavioral outcomes. Not only that, establishing basic good health habits, such as hand washing and other measures to prevent diseases at the early stages have found to be considerably increasing school attendance rates.

Subdomains for the Physical Well-Being Domain of the Primary Level	
Subdomains	**Description**
Physical health and hygiene	Understanding how disease is acquired is important at this level. Children learn how to prevent infectious diseases through hygiene, water and sanitation practices and noninfectious diseases through health and behavioral choices.
Food and nutrition	Outcomes for food and nutrition can vary widely by context. This domain involves recognizing how food has an impact on mind and body functions. In some contexts the focus is on making sure children get enough nutrients, while in others the focus is on eating the right amount of food to maintain a healthy weight.
Physical activity	Physical activity includes exercise and developing individual talents through sports and games.
Sexual health	Sexual health at the primary level varies by context, but includes understanding basic concepts of human reproduction.

(c) Post-primary Level

It has been found that adolescence is a key time for people to form health behaviors and make decisions with a potential long-term impact upon their health. In the beginning the concept of physically well-being used to be referred only to literacy skills having implications for health. However, the term now has been broadened representing the knowledge

and behaviors, which supports self-management of health.

Subdomains of the Physical Well-Being Domain for the Post-primary Level	
Subdomains	**Description**
Health and hygiene	Health and hygiene includes knowing and applying healthy behaviors and hygiene practices, including those that are related to positive mental health outcomes.
Sexual and reproductive health	Sexual and reproductive health refers to understanding basic concepts of sexual health, family planning, pregnancy and childbirth.
Illness and disease prevention	Illness and disease prevention involves knowing how health conditions are acquired or transmitted and implementing strategies for prevention, including nutrition and exercise choices.

2. Social and Emotional

Social development includes the ways children and youth perceive themselves in relation to others and it refers the behaviors they foster and maintain relationships with adults and peers. Emotional development is closely linked and refers to manners children and youth understand and control their behavior and emotions. This domain also includes aspects of personality and other social skills, including communication and development of acceptable values that are important as children and youth develop both cognitive and non-cognitive skills.

(a) Early Childhood Level

It has been established that proper social and emotional development has greater impact on effective relationships, as well as cognitive development and academic achievement in the early school years. Also, social and emotional development of children is important for the completion of their schooling and adjustment in the society in later years.

Subdomains of the Social and Emotional Domain for Early Childhood	
Subdomains	**Description**
Self-regulation	Self-regulation refers to the ability to regulate and control one's emotions, behaviors, impulses and attention according to the corresponding developmental stage and cultural or social environment. In older children, this may refer to the ability to follow simple rules, directions and routines as well as the capacity to move through transitions between activities with minimal adult direction.
Emotional awareness	Emotional awareness involves understanding how emotions affect personal behavior and relationships with others. Emotional expression is the way in which one displays or experiences states of emotions. Emotional regulation is the capacity or ability to identify and control emotions.
Self-concept and self-efficacy	Self-concept and self-efficacy refer to a child's awareness of his or her preferences, feelings, thoughts and abilities. Self-efficacy means developing confidence in one's competence and ability to accomplish tasks, which includes acknowledgment of one's limitations without loss of self-esteem. This also includes starting to demonstrate age-appropriate independence in activities and tasks.
Empathy	Empathy refers to the ability to understand the feelings of others by relating them to one's own emotions.
Social relationships and behaviors	Social relationships and behaviors refer to how a child interacts and communicates with familiar adults and peers. Ideally, children establish age-appropriate, secure attachments to trusted adults and friendships with peers. They respond to emotional cues and use age- and socially appropriate behavior when interacting with adults and peers. Social relationships at this age may also include cooperating and working together, sharing, taking turns and helping. Children begin to recognize the need to compromise and negotiate.
Conflict resolution	Conflict resolution refers to the extent to which a child uses nonaggressive and appropriate strategies to resolve interpersonal challenges and differences. Conflict can be resolved alone or with the intervention of an adult, an older child or a peer.
Moral values	Moral values refer to a child's framework for moral behavior by developing morality, or a system for assessing human conduct, and moral identity, how moral values influence decision making. Children reflect on the deeds and misdeeds conducted individually and by others (i.e., right or wrong behavior), consider motivation behind various actions and identify possible consequences.

(b) Primary Level

It has been accepted that development of social skills, including interpersonal skills, the ability to change, the acquisition of ethical values and cultural norms, and emotional skills including the ability to resolve conflicts and coexist with others are also equally important alongside the acquisition of academic knowledge. It is believed that social and emotional competence is critical in its own right and it also is significantly related to other aspects of learning to make education more meaningful to the life and function more effectively in tomorrow's world.

Subdomains of the Social and Emotional Domain for the Primary Level	
Subdomains	**Description**
Social and community values	Social and community values refers to knowledge and use of life skills, including communication, decision making, assertiveness, peer resistance, self-awareness, negotiation, friendship, self-esteem, advocacy for inclusiveness and nondiscrimination, and emotional intelligence.
Civic values	Civic values refer to knowledge and understanding of social and political concepts, such as democracy, justice, equality and citizenship. It may also include the ability to defend respect for rules and guidelines and propose modification appropriate to contexts in school, home and community.
Mental health and well-being	Children develop positive coping

(c) Post-primary Level

It is becoming more and more evident of the important roles played by social as well as emotional competencies for career success and effective undertakings of civic and family responsibilities. And, being socially involved is an important sign of individual's commitment. For this people need to have a mature, positive view of the self and civic competencies with better understanding of their responsibilities to society.

Subdomains of the Social and Emotional Domain for the Post-primary Level	
Subdomains	**Description**
Social awareness	Social awareness is the ability to understand and respond appropriately to the social environment.
Leadership	Leadership is the ability to make decisions and act on those decisions autonomously or collaboratively as appropriate.
Civic engagement	Civic engagement is taking a responsible role in the management of society at the community level and beyond.
Positive view of self and others	Positive view of self and others reflects the aspiration to a high quality of life for individuals, their families and their community.
Resilience and grit	Resilience and grit refer to the ability to overcome failures and persist, even when it is difficult to do so. It refers to having a positive attitude and understanding that one can learn from failures and mistakes.
Moral and ethical values	Moral values are attributed to a system of beliefs, political, religious or cultural. Ethical values refer to the actions one takes in response to his or her values.
Social sciences	Social science is the understanding of society and the manner in which people behave and influence the world around them. It refers to the ability to analyze ourselves, values, beliefs and belonging, and culture relevant to others.

3. Culture and the Arts

Inclusion of arts education has received less attention compared to other domains of education even though it is a very important domain in the overall development of education quality. It is a well-known fact that foundation of learning in history and social sciences is built on children's cultural experiences in their families, school, community and country. Arts, in the field of education are often described as creative arts expression. And, it includes activities ranging from music to dance and drama, and visual, media and literary arts. Realizing the criticality of cultural and artistic learning opportunities for the educational empowerment, cultural and arts education have now been integrated into national curricula.

(a) Early Childhood Level

Everybody have experienced that all the children, right from their birth, respond in one way or the other when they are exposed to music, movement or other art forms. As early as birth, children begin to participate experientially through their bodies, minds and senses. It has been found that arts and culture are critical to the early development of children, as they have intrinsic value and promote development in other domains. Arts and cultural activities engage children cognitively, physically, socially and emotionally. Children learn language patterns and foundations through song and rhymes. They stimulate their brains and cognitive development, and they develop gross and fine motor skills by playing instruments or painting with their fingers. It has also been found that arts can be an important medium for the children having lingual, physical or other developmental challenges to help them express themselves and to engage with the activities around them. And, arts also provide a means whereby skills and learning in other domains can be integrated.

Subdomains of the Culture and the Arts Domain for Early Childhood	
Subdomains	**Description**
Creative arts	Creative arts refers to knowledge of and expression through activities from music; theater; dance or creative movement; visual, media, and literary arts. Arts promote development of children cognitively, physically, and socially and emotionally through their bodies, minds and senses. As early as birth, children begin to participate experientially in the arts through observing, listening and responding, and eventually by primary school entry they can begin to evaluate the arts through discussion and sharing of thoughts and opinions.
Self- and community identity	Self-identity refers to the developing awareness of one's characteristics or attributes and who one is as a person (including physical characteristics, age, gender, culture, etc.). Community identity refers to seeing oneself as a part of a group and awareness of common beliefs and characteristics a child shares with others (including culture, religion, values, etc.).
Awareness of and respect for diversity	Awareness of and respect for diversity refers to how a child sees differences in personal or group attributes (such as age, physical characteristics, gender, ethnicity, religion, levels of ability, family structure, etc.). Children begin to show age-appropriate competence in respecting people with diverse attributes and recognition that individuals can share some characteristics even if they differ in others.

(b) Primary Level

It has been found that involving children in creative and artistic learning can positively affect their academic achievement and the social development. It is also found that arts education opportunities motivate students to learn and develop positive perceptions of the school environment. And, teaching of arts education in primary schools is found to build appreciation for the cultural and artistic expressions of others in children. Teaching through and about culture and artistic forms also lays a foundation for children to understand human relationships and the world around them. It also gives young people the opportunity to create their own works and provides them with a foundation for responding and evaluating other experiences, ideas and thoughts around them. Also, arts education when taken as an approach to teaching other academic subjects and learning outcomes, plays an important role in the development of cognitive, social, literacy, communications and inquiry skills, and emotional development of children.

Subdomains of the Culture and the Arts Domain for the Primary Level	
Subdomains	**Description**
Creative arts	Develop an understanding of different artistic processes, and learn how to create, perform, respond to, or evaluate works in one or more artistic forms: dance, music, theater, visual or media arts. Learn how to apply artistic processes to other areas of their learning and development, such as language development, math, science or critical thinking.
Cultural knowledge	Increase knowledge of other cultures, as well as one's own culture, and develop an appreciation of the similarities and differences that exist between oneself and other cultures and how to respect, honor and live peacefully with others from diverse backgrounds.

(c) Post-primary Level

It has been found that culture and the arts was a missing area for the post-primary level. However, there are direct references in policies and frameworks from EFA to the CRC framework, to UNESCO's Declaration on Cultural Diversity (2001) that the domain of arts and culture is critical to other global education initiatives. And, cultural and artistic contents and approaches in learning are critical to achieving global education. These documents recognize that the arts provide a means for improving the quality of teaching and learning, as well as supporting increased access through participation and retention of learners.

Subdomains of the Culture and the Arts Domain for the Post-primary Level	
Subdomains	**Description**
Creative arts	Creative arts is understanding and expressing, creating, perceiving and responding in personal, social, cultural and historical contexts
Cultural studies	Cultural studies allows people to have a common understanding of the interconnectedness between identity, society and culture. It relates to the artistic contexts of culture and history, and environment contexts.

4. Literacy and Communication

The domain of literacy and communication includes skills required to communicate in the primary language(s) of the society in which the child lives as well as beginning skills that enable children to both communicate and gain knowledge through the written word. Although, literacy is considered as one of the primary goals of education globally, various evidences make it clear that large segments of the population in the least developed countries, emerging economies, and the industrialized world demonstrate limited literacy abilities in spite of numerous global efforts.

(a) Early Childhood Level

It has been accepted now that the process of becoming a person literate begins form the infant stage. It has been observed that infants detect and use phonotactic patterns to determine word boundaries from about six to twelve months of age. And, the core of language acquisition with much of the necessary basic phonology, syntax, and vocabulary occurs between 18 and 48 months. It is estimated that by the age of four, depending upon the situation, children may have been exposed to as much as 30 million words. It is noticed that children from upper socio-economic homes may have double the number of unique vocabulary words as those in the lowest group. The rate of vocabulary acquisition at age three predicts vocabulary knowledge, language development, and reading comprehension at ages 9-10.

However, despite the socioeconomic status, it is the exposure to richness of spoken language that makes a difference in children's lives. Hence, it is now accepted that language development prior to beginning of school serves as the backbone of later literacy development. And, a solid foundation in language and literacy in early childhood supports later learning. Also, it is emphasized that learning should occur and be measured in mother tongue language. And, oral language development (speaking, listening, and understanding) is consistently emphasized as being important at the global level.

Subdomains of the Literacy and Communication Domain for the Early Childhood Level	
Subdomains	**Description**
Receptive language	Receptive language refers to hearing and understanding spoken language. Early receptive language abilities form the foundation for later oral comprehension skills.
Expressive language	Expressive language refers to a child's ability to speak a language. A child's expressive language becomes increasingly fluent throughout early childhood.
Vocabulary	Vocabulary acquisition plays an integral role of both of these abilities, providing increasingly sophisticated ways of communicating and understanding needs, thoughts, emotions and ideas.
Print awareness	Awareness of print concepts and conventions (e.g., direction of print, understanding that printed symbols represent spoken words) forms the foundation for later literacy skills.

(b) Primary level

Literacy and communication are foundational skills on which children build knowledge and later academic success. The importance of learning to read early cannot be underestimated. Through wide reading, children develop a larger vocabulary that in turn helps them read and understand new material. Children's exposure to oral and written language happens in the home and community, in preprimary programs and in primary school. It is observed that although children can acquire basic word level skills in the first two years of schooling even in languages they do not speak, they must also be proficient in the language in which they are learning to read in order to fully develop reading skills, including the comprehension skills needed to read to learn

Decades of language acquisition research show that children who become literate and fluent in their first language have better outcomes for overall language, cognitive development and academic achievement. Therefore, to the extent possible, children's introduction to print should be in a language they speak. It is a well-established fact that the achievement of a child who goes to school without understanding a word of what the teacher is saying cannot be expected to the same competencies as a child who is learning in her/his mother tongue.

The ability to read fluently, that is accurately, with expression, and a good speed, is necessary for comprehension. Comprehension is more than just understanding what is read; a child must transform that understanding, communicate it,

and use it to build new knowledge. Reading comprehension is impacted by a child's vocabulary, background knowledge, and ability to use comprehension strategies. To accomplish this, children have to be aware of their own understanding and they must possess strategies for accessing and organizing information that is presented in text.

Subdomains of the Literacy and Communication Domain for the Primary Level	
Subdomains	**Description**
Oral fluency	Oral fluency is the extent to which a child speaks in the language(s) used in his/ her environment.
Oral comprehension	Oral comprehension the extent to which a child understands the language(s) used in his/ her environment.
Reading fluency	Reading fluency refers to how easily a child can read, it includes speed, accuracy, and prosody (expression). It is sometimes measured by calculating the speed and accuracy with which a child reads. In order to read fluently children use strategies when encountering new words including decoding (in alphabetic languages), knowledge of work parts (such as prefixes and suffixes in Bahasa Indonesia and English, or characters in Chinese), context clues, and background knowledge.
Reading comprehension	Reading comprehension refers to how well a child understands what he or she is reading, sometimes measured by answering questions about a passage of text or retelling.
Receptive vocabulary	Receptive vocabulary describes the words a child knows well enough to understand when reading or hearing them.
Expressive vocabulary	Expressive vocabulary describes the words a child knows well enough to feel comfortable using when speaking or writing.
Written expression/ composition	Written expression and composition refers to how a child captures ideas through writing. Students may initially focus on producing the written symbols of the language (handwriting) and writing simple original texts and progress to writing for a variety of purposes (e.g., fiction, non-fiction)

(c) Post-primary Level

It is known that skilled adolescent and adult readers and writers are far more likely to be successful at home and in the workplace than their unskilled peers, who are too often doomed to a cycle of poverty, unemployment, and other economic, social and personal setbacks. Thus, youths will impact their competence in personal, occupational and community life depending on the qualities of literacy competence individuals develop.

It has been observed that language and literacy skills developed in the primary years are not adequate for the challenges of increasingly complex literacy tasks youth and adults are expected to perform in society and the workplace. Every new text and communication context requires a refined application of literacy skills and abilities. It is also the case that these language and literacy processes are contextual in that they are bounded by place, history, social interaction, and function. Therefore, development efforts, while attempting to expand literacy capacities of youth and adults, should respect existing forms of social organization, local knowledge, and local language, and build on rather than replace them.

Subdomains of the Literacy and Communication Domain for the Post-primary Level	
Subdomains	**Description**
Speaking and listening	Speaking and listening is understanding and expressing ideas effectively in the appropriate language or languages.
Writing	Writing refers to the ability to produce meaningful written text for a variety of purposes.
Reading	Reading skills include understanding written texts, their construction and the effect the texts are trying to achieve. Written

5. Learning Approaches and Cognition

Learning approaches and cognition has been defined as the ability to take initiative, solve problems that come up in work and play, make use of available resources and reflect on experiences. It refers to engagement, motivation, and participation in learning. Learning approaches include many of the skills considered "executive functioning," which refer to inhibitory control, working memory and the ability to organize, plan and reflect on one's learning.

It is well known that cognition is described as the mechanics of thinking and processing information. More specific processes include reasoning, inferring, problem solving, classifying, relating, creating, generating plans and strategies, conceptualizing and thinking. And the domain of learning approaches and cognition contains the fundamental capabilities that support other types of learning, yet is also learnable in its own right. Hence, it has come to be recognized as "learning to learn". Learning to know is taken as one of the knowledge relevant at the global level. Learning to know

refers to combining sufficiently broad general knowledge with the opportunity to work in depth on a small number of subjects. Hence, learning to learn allow individuals to benefit from the opportunities education provides throughout life, and potentially adds to their adaptability and resilience to change.

(a) Early Childhood Level

Everybody knows that children are born with an innate desire to discover the world around them in their daily interactions with adults nearby and the environment in which they grow. They are active in their own development exploring the environment, learning to communicate and building ideas and theories about how things work. For this, children need to have the capacities to multitask, to display self-control, to follow multiple-step directions even when interrupted, and to stay focused on what they are doing. It has been established that these skills undergird the deliberate, intentional, goal-directed behavior that is required for daily life and success at school and work. And it has been found that there is a strong base of evidence demonstrating that early cognitive abilities are the best predictors of later academic skills.

Many studies have consistently found positive associations between measures of children's ability to control and sustain attention with academic gains in the preschool and early primary school years. They also point to the importance of learning approaches, attention skills, and executive functioning for children's academic success. And, the ability to engage in tasks, plan one's approach, and reflect on the outcomes has been shown to be a strong predictor of children's academic growth over time. Learning approaches focused as a combination of persistence, emotion regulation, and attentiveness in kindergarten contributes to children's academic skills, regardless of ethnic background and socio-economic status.

Subdomains of the Learning Approaches and Cognition Domain in Early Childhood	
Subdomains	**Description**
Curiosity and engagement	Refers to a child's interest in topics and activities, often shown through asking questions, using imagination and eagerness in learning or approaching new tasks.
Persistence and attention	Children show persistence through beginning and completing activities, especially challenging tasks. This involves the ability to think through the steps involved in a process (such as building a structure with blocks or sticks) and carry out the steps in the process.
Autonomy and initiative	Abilities related to working alone, knowing when and how to seek out resources to complete a task and persisting at that task.
Cooperation	Describes how children interact with adults and peers, including their interest and engagement in group experiences in the context of learning. It involves understanding that some tasks require more than one person to complete. Children may plan and initiate a group activity or join in cooperative play with others.
Creativity	Creativity involves the ability to go beyond the techniques normally used to approach a problem and generate innovative solutions. Creativity can also be demonstrated in how children communicate their ideas, such as through the creative arts (visual arts, music, dance, dramatic play).
Reasoning and problem solving	Reasoning and problem solving are mental (and sometimes physical) activities that use new and known information to reach new conclusions. This includes deductive and inductive reasoning.
Early critical thinking skills	Early critical thinking skills involve being able to think about and articulate one's point of view or solution as well as critique others' opinions and conclusions. It involves metacognitive skills in that a child must be able to think beyond the task or activity at hand and figure out the defining features of appropriate actions and solutions, examine past conclusions and apply this knowledge to the problem at hand.
Symbolic representation	Symbolic representation refers to the use of symbols or objects to represent something else. This is often observed when children engage in pretend play or represent people, places or things through artwork.

(b) Primary Level

According to the revised Bloom's taxonomy, which describes educational outcomes, cognition begins with using memory to recall factual knowledge, and then progresses to constructing meaning and then applying knowledge to new situations.

It has been found that as children begin formal education, they approach learning tasks with increasing attention and persistence. They learn to work together and alone to complete tasks. Cognition describes how children think, and how they solve problems in a variety of content areas (mathematics, science, social situations, etc.). Children increasingly make use of metacognitive skills, using prior successful problem-solving strategies and developing new ones. They

are able to draw on both informal out-of-school and formal schooling experiences in developing more sophisticated strategies and transferring these strategies to new problems. And, it is observed that children who are able to sit still, concentrate, and persist at a task despite minor setbacks or frustrations, listen and follow directions, and work independently are more likely to avoid early school failure.

It is noted that in the primary school years, children's strategies move from guessing to the use of systematic rules (i.e., subtraction results in smaller numbers). Children who have conceptual knowledge in specific domains (measurement tools, number sense, animal biology, etc.) learn problem-solving procedures in these areas more quickly than children without this knowledge.

Subdomains of the Learning Approaches and Cognition Domain for the Primary Level	
Subdomains	**Description**
Persistence and attention	Children show persistence through beginning and completing activities, especially challenging tasks. Skills related to studying can fall under this category.
Cooperation	Children interact in a variety of group settings, both contributing to the task at hand as well as learning from more knowledgeable peers and adults. It involves engaging in and completing tasks that require more than one person to complete.
Autonomy	Abilities related to working alone, knowing when and how to seek out resources to complete a task and persisting at that task.
Knowledge	Includes factual, procedural and conceptual knowledge. Children recall previously learned facts, problem-solving procedures and draw on their conceptual understanding of a problem or topic. This knowledge serves as a foundation for more conceptually complex problem-solving tasks.
Comprehension	Children construct meaning from data and material, including interpreting, classifying, summarizing and comparing.
Application	Children apply prior knowledge to solve new and/or challenging problems.
Critical thinking	Reasoning or judgment resulting from interpretation, analysis, or inference. Requires metacognition, which refers to one's knowledge of one's own cognitive processes (problem solving-strategies, deductions, generalizations, drawing on known facts to generate new knowledge, etc.).

(c) Post-primary Level

It is now recognized that knowledge is not acquired but created through learning. And, research does support the inclusion of cognitive and problem-solving considerations in a learning outcomes framework. Given their significance in a wide range of contexts, it is potentially very important to ensure that individuals are being given the chance to develop them. One widely recognized key to supporting learners to deal with the variety of approaches to learning is to assist people to become independent learners, which imply that they must recognize and respond to their own preferences. The ability of learners to understand and manage their own learning processes can be referred to as metacognition, a concept that has provided many insights into the learning processes of children and adults.

It has been understood that viewing learning as a tool that can help individuals and groups to resolve problems and to improve life quality can help to reinforce learning persistence and effective management of new knowledge. And, the fundamental insights that people have to be active in the process of learning and that those processes will vary for different individuals lead to the conclusion that people must be supported to develop strategies that will allow them to learn effectively throughout their lives.

Subdomains of the Learning Approaches and Cognition Domain for the Post-primary Level	
Subdomains	**Description**
Collaboration	Collaboration refers to the ability to work with others to address matters of shared concern.
Self-direction	Self-direction reflects the ability to act autonomously to collect and understand information.
Learning orientation	Learning orientation refers to the individual's commitment to using learning to respond to evolving demands.
Persistence	Persistence in learning captures the ability of individuals to begin and complete activities with attention.
Problem solving	Problem solving involves researching problems and finding innovative and effective solutions.
Critical decision making	Critical decision making refers to the process of finding and weighing evidence in assessing possible solutions to questions.

Flexibility	Flexibility is the ability to analyze and respond to changing life circumstances in a way that reflects resilience and commitment to achieving success.
Creativity	Creativity is the capacity to view circumstances in unexpected ways and find ways to reach satisfactory outcomes, including aesthetic and pragmatic considerations.

6. Numeracy and Mathematics

Mathematics is a quantitative language used universally to represent phenomena observed in the environment. Numeracy and mathematics in early childhood include number sense and related mathematical skills, such as operations, spatial sense and geometry, and patterns and classification. In primary school, children typically learn concepts related to numbers, operations, geometry and patterns, and they apply their knowledge of mathematics to solve problems. In the post-primary years, the domain of numeracy and mathematics refers to the ability of individuals to use quantitative ideas to understand the world around them and make informed financial and life choices.

Several global dialogues highlight the importance of numeracy and mathematics. There are two important policy objectives served by this domain. The first is economic development, with research indicating that countries with more engineering students have a faster-growing economy than countries with more lawyers. There can be economic and industrial benefits to strong numeracy and mathematical skills within the population. The second is that individuals with the numeracy abilities they need for everyday life can make more informed decisions in addition to being able to perform everyday calculations. This domain encompasses a wide range of benefits.

(a) Early Childhood Level

Early mathematical knowledge has been shown to be a primary predictor of later academic achievement in both reading and mathematics. Persistent problems in mathematics predict outcomes in secondary school and college attendance. Mathematical abilities can vary tremendously. Preprimary experience, cultures favoring quantitative activities, socioeconomic status, and societal and parental schooling expectations can all influence young children's numeracy skills throughout early childhood.

Subdomains of the Numeracy and Mathematics Domain for Early Childhood	
Subdomains	**Description**
Number sense and operations	The verbal counting sequence is an essential foundation for later object counting activities. These number words are eventually tied to individual objects as children mentally connect each number word in one-to-one correspondence with an object. Other important aspects of counting include knowing the "number after" a particular number, continuing a number word sequence from a number other than one and comparison of quantities. Operations involve the manipulation of sets. Addition involves the joining of two sets. For young children this is generally represented by problems that either join a set to a set the child already possesses or represent part-part-whole situations ("We have three girls and four boys in our group. How many children do we have altogether?"). Subtraction for young children usually entails separation activities ("If you have five blocks and you give me two, how many will you have left?").
Spatial sense and geometry	Geometry in early childhood includes shape recognition and naming ("That's a triangle!) and a rudimentary understanding of shape attributes (e.g., number of sides, angles). Spatial sense involves determining location and distance and ascertaining directionality and varies by culture and experience. Spatial sense provides the means for humans to navigate in their environments, and in early childhood, begin to communicate that knowledge. Terms such as under, over and far provide information about location and distance.
Patterns and classification	Sorting and classifying objects, observing patterns, and predicting what comes next in a pattern helps children develop the ability to recognize relationships and underlying structures in their environment. These skills are also the basis for later algebraic skills.
Measurement and comparison	Measurement is the process by which numerical values are assigned to continuous quantities. In early stages of measurement, children will use nonstandard measurement tools to ascertain attributes such as length or height ("Look, it takes six trains to fill the track!"), and later can use standard tools such as rulers to more precisely determine numerical attributes. Measurement requires

(b) Primary Level

It is a fact that through the development of mathematics, humans have enabled the advancement of science, technology, engineering, business and government. For people to participate fully in a productive society, they must know basic mathematics. Individuals who are unable to reason mathematically also have difficulty solving problems and reasoning

independently. And, the inability to understand basic numeracy and mathematics concepts results in everything from a lack of competence and fluency with many everyday tasks to a lack of opportunity for the future. Hence, developing numeracy and the capacity to apply numeracy skills to everyday tasks and more advanced problems is essential to success in school.

However, it is important that beyond mastering numbers and the application of numbers, children must be able to develop spatial skills and understand geometry so that they can model their environment and see the spatial relationship between objects. And most important, these types of knowledge and skills offer students entry to being able to understand a broad range of content domains, both academic and personal, including science, social studies, technology, economics, entrepreneurship and health.

Subdomains of the Numeracy and Mathematics Domain for the Primary Level	
Subdomains	**Description**
Number concepts and operations	This subdomain focuses on numbers and number systems. Mastery of this subdomain refers to understanding how numbers work to represent magnitude, that they can be ordered and counted, and that numbers are organized in systems (e.g., natural numbers, whole numbers, integers, and rational numbers). This subdomain also involves knowing how to compute with different number systems with fluency and whether the outcomes of these computations are reasonable. The four operations (addition, subtraction, multiplication and division) are emphasized in this subdomain.
Geometry and patterns	This subdomain focuses on the recognition of geometric shapes and on the recognition and development of patterns. For example, children may demonstrate mastery of sequencing patterns of numbers, shapes and objects or recognize and draw common two- and three-dimensional geometric figures.
Mathematics application	This subdomain focuses on application of number knowledge and operations to solve problems across a range of content domains. In addition, mastery in this subdomain requires that students be able to communicate their understanding of problems, interpret data and data displays, and reason in problem solving.

(c) Post-primary Level

Numeracy and a degree of mathematical awareness have long been recognized as a central outcome for schooling systems. Numeracy is seen as a fundamental component of learning across other areas of the curriculum. It involves a combination of reinforcing mathematical concepts and skills from across the discipline (numerical, spatial, graphical, statistical and algebraic); mathematical thinking and strategies; general thinking skills; and grounded appreciation of context. There are a number of studies showing the effects of numeracy in terms of enhanced comprehension of everyday information.

In recent years, the term “mathematical literacy” has become accepted as shorthand for the domain of numeracy and mathematics. It is concerned with the capacity of students to analyze, reason and communicate ideas effectively as they pose, formulate, solve and interpret mathematical problems in a variety of situations. The research literature supports numeracy and mathematical capability and confidence as highly significant learning outcomes. And so, Mathematics and numeracy are important for understanding the world around us.

Subdomains of the Numeracy and Mathematics Domain for the Post-primary Level	
Subdomains	**Description**
Number	Ways of understanding numbers, the relationships between them and number systems, covering skills in relation to whole numbers, fractions and decimals, integers, and ratios and percentages.
Algebra	Recognizing patterns, using algebraic symbols to represent mathematical situations, solving linear equations and using algebraic models to solve real-world problems.
Geometry	Understanding the properties of geometric shapes, using geometric properties to solve problems, understanding and use of geometric measurement, understanding coordinate points and the use of geometric transformations.
Everyday calculations	Applies understanding of numbers effectively in a variety of common settings.
Personal finance	Managing individual and family financial decisions in an informed way.
Informed consumer	The ability to select products and assess benefits on the basis of numerical information.
Data and statistics	Understanding the concept of data and statistics, methods of organizing and displaying data graphically, the calculation of means, medians, modes and ranges, and the skill of reading statistical graphs.

7. Science and Technology

Science can be defined as specific knowledge or a body or system of knowledge covering physical laws and general truths. Children and youth move from spontaneous knowledge gained in their natural environments to scientific knowledge gained through formal schooling. Technology refers to the creation and usage of tools used to solve problems. It includes physical technology (such as machines), the application of methods or systems and computer-based solutions. And, the notion that high-level performance in science and technology areas is highly desirable for national economic performance has been widely accepted for some decades.

(a) Early Childhood Level

In the past, science and technology have not been as important domains in early childhood. And so, science and technology is an emerging domain at the global level in early childhood. For young children, scientific thinking can be thought of as knowledge seeking. In a very basic way, children connect new knowledge with known knowledge or rudimentary theories, adjusting their understanding of the world when the new evidence adds to or contradicts old knowledge. Children's knowledge of science evolves from what some consider innate knowledge to a much deeper understanding in the later years of early childhood.

Knowledge of the physical world begins early. Infants have expectations that the laws of physics will be followed; if a ball rolls into a second ball, infants expect that the second ball should move immediately, not moments later. Children's understanding of the shape of the Earth evolves from viewing it as flat world to understanding that it is a sphere in space. In the biological world, children seem to understand that behaviors of living things are directed to sustain life and have other rudimentary understandings of animal biology. It appears that children continually revise their understandings or theories about how the world works, but that this ability is dependent on domain-specific knowledge and experience.

Subdomains of the Science and Technology Domain for Early Childhood	
Subdomains	**Description**
Inquiry skills	Ability to ask questions that are relevant to solving problems; ability to identify what knowledge is lacking in order to do so, and how to acquire it. These rudimentary skills are present in children as young as three to four years of age.
Awareness of the natural and physical world	Young children have rudimentary knowledge of the natural and physical world; this includes concepts of time, speed, force, temperature and weight. This knowledge is gained through interactive experiences in the physical world (rocks are heavier than flowers, ants crawl faster than slugs, etc.).
Technology awareness	In the broadest sense, technology refers to tools children use to solve problems or perform tasks. The available technology in a child's environment may include anything from a shovel or simple toys to computers, cellular telephones, tablets and gaming devices.

(b) Primary Level

Children construct theories about how the world works. As they gain scientific knowledge pertaining to these theories, and utilize the tools of scientific thinking (inquiry, analysis, inference and argument), their conceptual understanding advances and these theories are refined. Many of the challenges that the world faces in health, the environment and energy resources will require thinking and solutions that are informed by knowledge of science and engineering.

While learning in this domain is important, many children do not have opportunities to develop these skills. At the global level, primary school teachers often do not have the specific training to adequately teach science topics. It is difficult to ascertain how well children around the world are mastering concepts in this domain, given that research on science and technology learning is largely conducted in the high-income countries.

Subdomains of the Science and Technology Domain for the Primary Level	
Subdomains	**Description**
Scientific inquiry	Ability to ask questions, identify what knowledge is lacking and know how to acquire it. This includes knowledge of basic problem solving perspectives of science (including the scientific method) and the ways they can be applied.
Life science	Describes the study of living things, life cycles, reproduction, heredity and interaction. Life science also covers interaction with the environment and ecosystems. Health is commonly included in life science.
Physical science	Includes the domains of matter, motion and energy. Physical science is the study of what things are made of, how they interact with one another and how energy may move from place to place.

Earth science	The study of the earth in the solar system, geology, oceanography, weather and climate and resources.
Awareness and use of digital technology	Digital technology refers to the variety of ways children interact with available information and communication technologies. At the primary level, children may have access to cellular telephones, computers, tablets, etc.

(c) Post-primary Level

Knowledge of science does not imply simple acceptance of Western scientific ideas, but rather sufficient capability and familiarity to engage with scientific and technical ideas critically and assess their implications. When considering scientific and technological knowledge, it is important to recognize that there are many forms of indigenous knowledge that play a critical and significant role for the people who possess it. This underlines the need for measurements of scientific understanding to be contextualized, nuanced and reflective of individuals' life experiences.

An answer to the question "As citizens, what knowledge is most appropriate?" certainly includes basic concepts of the science disciplines, but that knowledge must be used in contexts that individuals encounter in life. And, people often encounter situations that require some understanding of science as a process that produces knowledge and proposes explanations about the natural world. For many people in the world, one important dimension is a critical approach to the use and implications of communications technology. The increasing importance of environmental knowledge must also be recognized within this domain.

Subdomains of the Science and Technology Domain for the Post-primary Level	
Subdomains	**Description**
Biology	Understanding the structure, life processes, diversity and interdependence of living organisms.
Chemistry	Understanding of concepts related to the classification and composition of matter, the properties of matter and chemical change.
Physics	Understanding of concepts related to physical states and changes in matter, energy transformations, heat and temperature, light and sound, electricity and magnetism and forces and motion.
Earth science	The study of the Earth and its place in the solar system and the universe.
Scientific approaches	Knowledge of the basic problem-solving perspectives of science and the ways they can be applied.
Environmental awareness	Knowledge of ecological and other natural factors and the ability to respond to them.
Digital learning	The ability to engage effectively with digital communication technologies in each step of the learning process.

Annex: Table A: Guiding Questions for Countries: Technical

Breadth of learning domains assessed	• What domains or subject areas are assessed through national assessments and examinations? • What domains or subject areas are assessed either formally or informally in the classroom to improve learning? • Are additional data collected to inform policymaking, including information on child, teacher and learning environment characteristics? • How are data across various domains communicated and used for policy, programming, planning and budgeting?
Educational stages and Populations assessed	• At what ages or educational stages are assessments conducted? • Are there efforts to measure learning outcomes for out-of-school children and youth? • Are there efforts, such as household surveys, to measure learning for students enrolled in non-formal, private or religious schools?
Quality of formative assessments	• Do teachers continuously assess children? Is there system-wide institutional capacity to support and ensure the quality of classroom assessment practices, such as tools or training provided to teachers? • In which subjects or domains are students assessed? • Do teachers have opportunities to share experiences and innovations in assessment? • How do formative assessments inform decisions for individual students, the school and the system?

Quality of summative assessments	• Is there a national assessment system in place? • Does the assessment meet the accepted standards of quality? • Is the assessment implemented with consistency and at regular intervals? • How do classroom assessments, portfolios, grades or marks figure in decisions regarding students?
Quality of examinations	• Is there a national examination of acceptable quality? • Are national examinations perceived as fair for all students and free from corruption? • Are additional sources of reliable evidence (e.g. teacher evaluation) used to make high-stakes decisions on student placement?
Human resources	• Are there sufficient technical experts (psychometricians, content area specialists in each domain, statisticians, policy analysts, etc.)? • If not, in what specialties is there a need for more expertise? • Are there strategies to train staff in these areas and retain them once they have received training?

Annex: Table B: Guiding Questions for Countries: Institutional

Alignment of assessment and curriculum	• Does the formal curriculum or standards framework specify learning out comes? • Are the measures used to assess learning closely linked to the national curriculum and standards? • Do national examinations fairly measure learning outcomes against the intended curriculum? • What learning domains are included in the assessment framework? • What educational stages or levels are included in the assessment framework? • How are assessment results used to influence teaching, curriculum modification, and assessment and examination content?
Institutional Capacity for assessment	• Is there a formal institution (or institutions) responsible for assessment? • Does the institution have adequate human and financial resources? • Does the institution have responsibility and capacity for: i) national examinations; ii) national assessments; iii) guidelines for continuous assessments; iv) international or regional assessments?
Multi-stakeholder decision making	• Who makes the decisions on what learning outcomes are measured? • Are teachers, students and parents included in the decisions? Do they represent all educational stages, from pre-primary through upper secondary? • Are nongovernmental stakeholders included, such as civil society, academia and the private sector? • Is there a formal group or institute that exists to build consensus on how learning is measured? • Is there national transparency and dialogue around assessment outcomes and how to use the information?
Coordination of Assessment efforts	• Do the agencies and organizations involved in assessment communicate or share resources? • Does the government accept the results of assessments conducted by nongovernmental actors? • Do teachers and school leaders see the value of the assessments and are they aligned to what they are teaching? • Does the public and civil society generally accept the assessment results produced by the government? • Are efforts to assess young children and out-of-school children and youth aligned with efforts to assess children in schools?

Annex: Table C: Guiding Questions for Countries: Political

Public awareness and demand	• In public debates about education, is the focus typically on access or is learning part of the debate? • How is learning defined in public discourse (e.g. literacy, citizenship, STEM)? • Are there mechanisms through which citizens can advocate for better education? • Does the public recognize the value of assessment and the existing assessment systems?
Political will of government to assess and share results	• How frequently does the government implement a nationally representative assessment of learning? • After how many months are the results released? • At what levels and in which domains are the assessments conducted? • How are the results reported and promoted? • How are results used at the classroom, school, local and national policy levels?
Policy effects of assessments	• Is there a connection between assessment results and education policy? • Are there sufficient resources devoted to improving learning based on the assessments? • Are learning outcomes improving in the areas targeted through new policies? • Are there effects on practice, including curriculum, teaching, training and testing?