United Nations
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UNESCO
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Center for
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# Toward Universal Learning

## What Every Child Should Learn

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**Report No. 1 of 3**
**Learning Metrics Task Force**
**February 2013**


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*Toward Universal Learning: What Every Child Should Learn* is the first in a series of three reports from the Learning Metrics Task Force. Subsequent reports will address how learning should be measured within the global framework of learning domains proposed herein, and how measurement of learning can be implemented to improve education quality.

This report represents the collaborative work of the Learning Metrics Task Force's members and their organizations, a technical working group convened by the task force's Secretariat, and more than 500 individuals around the world who provided feedback on the recommendations. Members of the Standards Working Group who wrote the report are listed on page iii.

## About the Learning Metrics Task Force

The UNESCO Institute for Statistics and the Center for Universal Education at Brookings have joined efforts to convene the Learning Metrics Task Force. The overarching objective of the project is to catalyze a shift in the global conversation on education from a focus on access to access *plus* learning. Based on recommendations from technical working groups and input from broad global consultations, the task force works to ensure learning becomes a central component of the global development agenda and make recommendations for common learning goals to improve learning opportunities and outcomes for children and youth worldwide. Visit www.brookings.edu/learningmetrics to learn more.

This is a joint publication of the UNESCO Institute for Statistics and the Center for Universal Education at the Brookings Institution.

## The UNESCO Institute for Statistics

The UNESCO Institute for Statistics (UIS) is the statistical office of UNESCO and is the UN depository for global statistics in the fields of education, science and technology, culture and communication. The UIS was established in 1999. It was created to improve UNESCO's statistical program and to develop and deliver the timely, accurate and policy-relevant statistics needed in today's increasingly complex and rapidly changing social, political and economic environments. The UIS is based in Montreal, Canada.

## The Center for Universal Education at the Brookings Institution

The Center for Universal Education (CUE) at the Brookings Institution is one of the leading policy centers focused on universal quality education in the developing world. CUE develops and disseminates effective solutions to achieve equitable learning, and plays a critical role in influencing the development of new international education policies and in transforming them into actionable strategies for governments, civil society and private enterprise.

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# Abbreviations and Acronyms

| | |
|---|---|
| ASER | Annual Status of Education Report |
| CONFEMEN | Conférence des ministres de l'Éducation des pays ayant le français en partage |
| CRC | UN Convention on the Rights of the Child |
| CUE | Center for Universal Education |
| EDI | Early Development Instrument |
| EFA | Education for All |
| EGMA | Early Grade Math Assessment |
| EGRA | Early Grade Reading Assessment |
| GER | Gross Enrollment Ratio |
| GPE | Global Partnership for Education |
| HECDI | Holistic Early Childhood Development Index |
| IEA | International Association for the Evaluation of Educational Achievement |
| INEE | Inter-Agency Network for Education in Emergencies |
| ISCED | International Standard Classification of Education |
| IUHPE | International Union of Health Promotion and Education |
| LAMP | Literacy Assessment and Monitoring Programme |
| LLECE | Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación |
| LMTF | Learning Metrics Task Force |
| MDG | Millennium Development Goals |
| MICS | Multiple Indicator Cluster Survey |
| OECD | Organization for Economic Co-operation and Development |
| PASEC | Programme d'Analyse des Systèmes Éducatifs de la CONFEMEN |
| PIAAC | Programme for the International Assessment of Adult Competencies |
| PIRLS | Progress in International Reading Literacy Study |
| PISA | Programme for International Student Assessment |
| SACMEQ | Southern and Eastern Africa Consortium for Monitoring Educational Quality |
| TIMSS | Trends in International Mathematics and Science Study |
| UIS | UNESCO Institute for Statistics |
| UNESCO | United Nations Educational Cultural and Scientific Organization |
| UNICEF | United Nations Children's Fund |

## Contents

# Introduction

The benefits of education—for national development, individual prosperity, health and social stability—are well known, but for these benefits to accrue children in school have to be learning. Despite commitments and progress in improving access to education at the global level, including Millennium Development Goal (MDG) 2 on universal primary education and the Education for All (EFA) Goals, levels of learning are still too low. According to estimations in the 2012 EFA Global Monitoring Report, at least 250 million primary-school-age children around the world are not able to read, write or count well enough to meet minimum learning standards, including those who have spent at least four years in school (UNESCO 2012). Worse still, we may not know the full scale of the crisis and this figure is likely to be an underestimate because measurement of learning outcomes among children and youth is limited and, relative to the measurement of access, more difficult to assess at the global level.

To advance progress for children and youth around the world, it is critical that learning is recognized as essential for human development. As EFA and the MDGs sunset in 2015, and the UN Secretary-General promotes the Global Education First initiative, the education sector has a unique window of opportunity to raise the profile of international education goals and ensure that learning becomes a central component of the global development agenda. To do this, the global education community must work collectively to define global ambition on improving learning and propose practical actions to deliver and measure progress.

In response to this need, UNESCO, through its Institute for Statistics (UIS), and the Center for Universal Education (CUE) at the Brookings Institution have co-convened the Learning Metrics Task Force (LMTF). The overarching objective of the project is to catalyze a shift in the global conversation on education from a focus on access to access plus learning. Based on recommendations of technical working groups and input from broad global consultations, the task force aims to make recommendations to help countries and international organizations measure and improve learning outcomes for children and youth worldwide. Rather than focusing just on developing countries, the task force decided that its recommendations should be truly global and address all countries. It was also agreed that equity within countries should be emphasized in addition to overall national learning levels.

The task force—which is made up of representatives of national and regional governments, EFA-convening agencies, regional political bodies, civil society, and donor agencies[1]—is engaged in an 18-month-long global consultation process to build a consensus around the answers to three questions:

- What learning is important for all children and youth?
- How should learning outcomes be measured?
- How can measurement of learning improve education quality?

In Phase I of the project, the LMTF's Standards Working Group convened from May to October 2012 to make recommendations on what learning is important globally. The prototype recommendations were circulated for public consultation from August through September 2012 and modified based on feedback

from more than 500 individuals in 57 countries. A draft framework was presented to the task force at an in-person meeting in September 2012. Over two days, the LMTF finalized a framework to be used by the subsequent working group on measures and methods to investigate the measurement of learning outcomes.

The Standards Working Group was tasked with developing a framework for learning outcomes that would not be restricted to those outcomes that lend themselves easily to measurement and are, as a result, currently prioritized. As one consultation respondent stated, "The seductive charm of numbers may well mean we evaluate whatever aspects of learning we are able to measure best and sideline those elements that are more intuitive and difficult to express numerically." The subsequent working group on measures and methods will examine how the competencies may be measured, looking beyond the most commonly measured domains of literacy and numeracy.

This report presents the results of a collaborative process to identify what domains of learning are important for children and youth to master in order to succeed in school and life. As such, the report's primary purpose is to document the process and describe the rationale for the proposed framework. Subsequent reports, to be released in 2013, will provide actionable recommendations for stakeholders in the global education community.

## What Learning Is Important for All Children and Youth?

The first phase of the Learning Metrics Task Force project addressed the overarching question of what learning is important globally. The Standards Working Group was charged with investigating whether certain standards, competencies, knowledge or areas of learning are important for children globally. A major topic of discussion for the task force is whether learning should be measured only in schools or whether all children should be assessed, regardless of whether they are or ever have been in school. To address this issue, it is important to examine the various contexts in which children are learning around the world.

Globally, 164 million children are enrolled in preschool programs, and the preprimary gross enrollment ratio (GER) is 48 percent (UNESCO 2012). However, access to preprimary programs is unevenly distributed, with a GER of only 15 percent in low-income countries. The children least likely to be enrolled in preschool are those belonging to minority ethnic groups, those with less educated mothers, and those who speak a home language different from the language used in school (UNESCO 2012). These are also the children most likely to benefit from high-quality preprimary programs. While many children, especially in high-income countries, attend formal, regulated preprimary programs, the majority of the world's young children only learn in nonformal contexts through unstructured or informal processes. For these children, learning typically occurs in the home and community through interactions with parents, siblings and other family members. Even when children are enrolled in preprimary programs, they may not be exposed to quality formal early learning opportunities.

Partially due to a global focus on universal primary education, the majority (89 percent) of primary age children are now enrolled in school (UNESCO 2012). Free, compulsory primary education is recognized as a fundamental human right (United Nations 1948), and primary education is compulsory in almost every country, according to the UNESCO Institute for Statistics (UIS 2012). Still, there are nearly 61 million out-of-school children of primary-school age, a number that has stagnated since 2008 (UNESCO 2012). While many children are either not enrolled in school or are enrolled in second-chance programs, the majority of children globally are learning in formal contexts.

However, the degree to which formal processes are good enough to ensure children's right to a decent education depends in large part on the quality of the teachers, curriculum and materials found in the school. In schools where there are enough qualified teachers and materials to respond to each individual child's learning needs, academic learning occurs through formal processes. In schools where teachers are not properly qualified, are overextended or do not come to work regularly, learning still occurs through peer-to-peer interactions—but not necessarily the types of learning intended by the school system.

The category of postprimary refers to the various contexts in which children learn beyond primary schooling. For most children, "postprimary" refers to secondary education. The task force decided that the recommendations of the LMTF should focus on lower secondary for this level, given the diverse areas of specialization students experience after this schooling level. The UIS reports that in 2010, lower secondary education was part of compulsory education in three out of four countries reporting data, and upper secondary was included in compulsory education in approximately one in four countries (UIS 2012). It is estimated that globally, 91 percent of children who entered school stay there until the end of primary school, and 95 percent of those students transition to secondary school. However, for children in low-income countries, only 59 percent make it to the last year of primary school and 72 percent of those students successfully transition to secondary school (UIS 2012). For children who do not attend secondary school, learning occurs mainly through work, family and community experiences (i.e., nonformal, unstructured contexts).

## When Are Children Learning?

The times when children learn can be described through stages (early childhood, primary and postprimary), schooling levels, and/or age groups. How these groupings correspond to one another varies across countries and even across individual children. The following table attempts to define the stages, schooling levels and approximate age spans for these groups. The schooling levels are based on the 1997 revision of the International Standard Classification of Education (ISCED) (UNESCO 1997). Note that the age spans overlap intentionally to account for wide variations in when children begin and end school. The ages in the final column, "approximate milestone at which learning might be measured at a global level," correspond to key points of primary school entry, end of primary cycle, and end of lower-secondary cycle.

**Table 1. Stages, Schooling Levels and Approximate Age Spans for Measuring Learning Outcomes**

| Stage | Schooling Level | Approximate Age Spans for Stage and Schooling Level | Approximate Milestone at Which Learning Might Be Measured at a Global Level |
|---|---|---|---|
| Early childhood | Birth through school entry, including ISCED 0 (preprimary, including formal and nonformal) | 0–8 | School entry |
| Primary | ISCED 1 (lower and upper primary) | 5–15 | End of primary cycle |
| Postprimary | ISCED 2 (lower secondary) | 10–19 | End of lower secondary cycle |

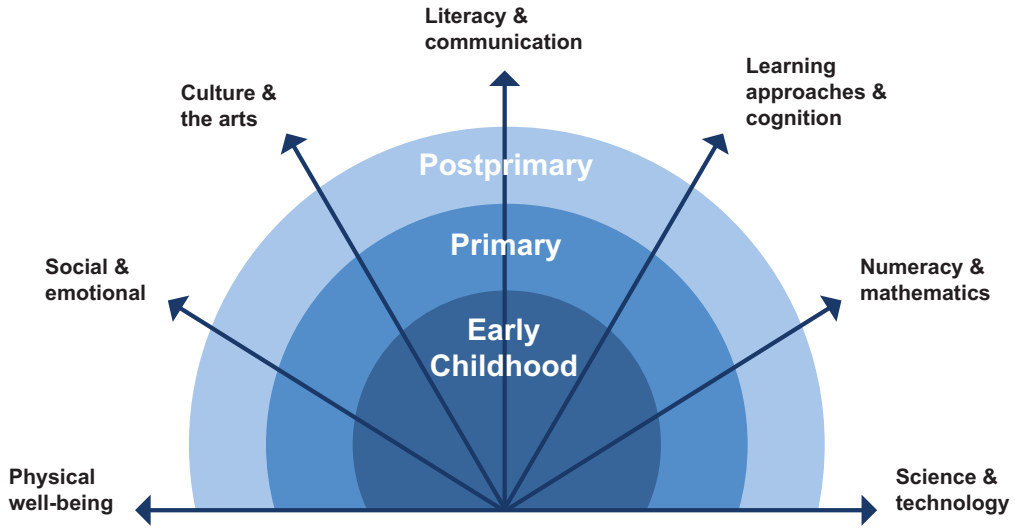
# A Global Framework of Learning Domains

Given the various structures, places and times at which humans learn, it is difficult to define what outcomes related to learning are important, especially at a global level. However, based on (1) research, (2) global policies and dialogues and (3) the real-life experience of those working in education, the working group and task force identified certain outcomes as important for all children and youth to develop. Based on the recommendations of the 39 working group members, input from global consultations and task force deliberation, seven domains and corresponding subdomains of outcomes related to learning are proposed as important for all children and youth (see Figure 1 and annex D for a detailed description of the methodology used in determining these domains):

- Physical well-being
- Social and emotional
- Culture and the arts
- Literacy and communication
- Learning approaches and cognition
- Numeracy and mathematics
- Science and technology

Each arrow in Figure 1 represents one domain of learning, radiating outward as a child expands his or her development or competency in a given area. The half circles represent three stages in which the task force will concentrate its recommendations: early childhood (birth through primary school entry); primary and postprimary (end of primary through end of lower secondary). The arrows extend outward beyond the diagram to indicate that an individual may continue learning more deeply in a given area at the upper secondary, tertiary, or technical/vocational level or through nonformal learning opportunities.

**Figure 1: A Global Framework of Learning Domains**




*Note: This framework is intended for the purpose of the Learning Metrics Task Force to identify areas in which to measure learning outcomes. It is not intended to be used as a framework for policymaking, curriculum or instruction.*

# Considerations Related to the Seven Domains

The task force noted several considerations for various populations and contexts related to the seven domains. The following subsections describe these aspects.

## Children with Disabilities

An estimated 15-20 percent of students worldwide have special learning needs, and children with disabilities are less likely to enroll in and complete school than their nondisabled peers (World Health Organization and World Bank 2011). In low-income countries, their exclusion from education can be very significant and result in lifelong discrimination.

The LMTF framework covers a broad set of learning outcomes so that children who struggle with traditional academic or cognitive tasks have an opportunity to demonstrate strengths in a variety of domains. With targeted instructional support and accommodations, children with disabilities can make progress toward learning goals in all seven domains. When assessing learning for children with disabilities, as with all children, a focus on individual progress can be more relevant in measuring and improving learning outcomes than a focus on absolute learning levels. More frequent and fine-grained monitoring of progress may be necessary to capture improvements in learning for children with disabilities.

## Gender

Gender may be more important in discussing the determinants of learning in the classroom than in making choices about outcome measures. Gender issues may be important across all domains, but especially in the physical well-being, social and emotional, and learning approaches and cognition domains. For example, in physical well-being the fact that girls can get pregnant and boys cannot, compounded with a social and cultural context of male power and female subservience, make necessary learning outcomes in this area quite different for boys and girls.

There is an implicit assumption in the LMTF framework that as the arrows radiate out, from level to level, children are developing and learning at a similar and steady rate. However, in many settings this is not always the case given delayed school entry ages as well as repetition rates. Thus particularly when looking at the physical well-being domain and the social and emotional domain, one needs to recognize that physical and emotional development may also be affected by age as well as by level. This is compounded by the fact that girls tend to reach puberty about two years before boys do. While one can reasonably assume that all postprimary students are older adolescents or young adults, one cannot assume that all primary students are preadolescent.

## Conflict and Emergencies

War and natural disasters can significantly disrupt a child's education and learning trajectory. When children are displaced due to these circumstances, they often are excluded from school for years, sometimes even generations. However, a high-quality education in emergency situations can provide physical, psychosocial and cognitive protection that can sustain and save lives (INEE 2010). In the domains of physical well-being and social and emotional, education can provide children with critical survival skills and coping mechanisms through learning about landmine safety, HIV/AIDS prevention and conflict resolution strategies. Learning may occur in formal schooling settings, but very often it occurs in informal ways during conflict and emergencies. Therefore, efforts to assess children's learning must take into account where school-age children are, what is being taught, mother tongue and language of instruction, and a variety of other factors (INEE 2010).

## Countries Demonstrating Low Levels of Learning

The current international capacity for measuring learning is concentrated most strongly in the domains of literacy and communication, numeracy and mathematics, and science and technology. While these studies do not provide a complete picture of what children and youth have learned, they are the basis for analysis of learning levels globally. Beatty and Pritchett (2012) argue that any leaning goals proposed as part of the post-2015 development agenda should be "based on feasibility, not wishful thinking." Goals are only successful in accelerating progress if they are perceived as achievable. In many developing countries, learning progress in the areas of literacy, mathematics, and science is stagnant or even declining based on results from national and international assessments. The authors estimate that given current trends, it would take Colombia 30 years and Turkey 194 years to reach mean Organization for Economic Cooperation and Development (OECD) levels of learning as measured by Trends in International Mathematics and Science Study (TIMSS), and that countries such as Indonesia, Iran, Jordan, Malaysia, Thailand and Tunisia will never catch up as learning levels have actually declined from one testing period to the next. Among countries participating in the SACMEQ (Anglophone countries in Southern and Eastern Africa), it could take four to five generations (150 years, on average) to catch up to mean OECD learning levels in reading, given current trends.

In another report, Pritchett and Beatty (2012) find that having an overambitious curriculum in countries where achievement levels are low can lead to a "curriculum gap," whereby more children are excluded from learning and never catch up. These countries end up being farther behind than ones in which the curriculum is appropriate for children's learning levels. Given these complexities, it appears that setting one-size-fits-all standards is unlikely to be useful at a global level. The LMTF must determine whether a framework can be developed that allows countries to set achievable goals based on current learning levels, understanding that a tiered system could send a message that high standards are achievable by some children and youth but not others.

## Sources of Evidence

The LMTF considered the following three main sources of evidence to develop its recommendations:

- Policies, including global goals, dialogue and frameworks for measuring these seven domains at the global level;

- Research linking the domains to well-being, academic achievement, life skills, etc.; and
- Feedback from global consultations.

### Policies and Global Dialogues

The major global frameworks and dialogues referencing goals of education and/or learning outcomes are the UN Convention on the Rights of the Child (1989), the DeLors Report (1996), Education for All (EFA) goals and the Dakar Framework for Action (2000), and Education First—An Initiative of the UN Secretary General (2012). The Global Partnership for Education (GPE) has engaged in a consultative process to develop indicators for GPE countries, among them basic literacy and numeracy. There is also a brief mention of learning outcomes in the Rio +20 Outcomes Document, "The Future We Want" (2012). A summary of the global frameworks is below, and a more detailed description is given in annex B.

- UN Convention on the Rights of the Child (CRC) (1989)
  - Article 24 encourages education of children and parents on "basic knowledge of child health and nutrition, the advantages of breastfeeding, hygiene and environmental sanitation and the prevention of accidents."
  - Article 28 calls for international cooperation in education with regard to "the elimination of ignorance and illiteracy throughout the world and facilitating access to scientific and technical knowledge . . ."
  - Article 29 refers to the direction of a child's education and includes elements related to personality, talents, mental and physical abilities; respect for human rights; respect for own and others' cultures; tolerance; and respect for the natural environment.
- The DeLors Report (1996): Identifies four types of knowledge: learning to know, learning to do, learning to live together and learning to be.
- EFA Goal 1 (2000): Comprehensive early childhood education that "should focus on all of a child's needs including health, nutrition and hygiene, cognitive, and social development."
- EFA Goal 6 (2000): Quality education "so that measureable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills."
- Rio +20, The Future We Want (2012): Calls for increased capacity of education to prepare for sustainable development and "more effective use of information and communications technologies to enhance learning outcomes."
- GPE Indicators (2012): Basic literacy and numeracy in the early grades have been proposed as indicators for Strategic Goal 2, Learning for All.
- Education First (2012): Improving the quality of learning is one of the three focus areas, with specific targets identified.

The existing frameworks for measuring learning at the multicountry level (cross-national, regional and international) are also indicative of consensus on learning outcomes. (For a description of these frameworks, see annex C and the LMTF background paper, "Multi-Country Assessments of Learning."[2])

### Research

The working group compiled relevant research on each of the seven domains for each age group. Working group members were selected for their familiarity with the research in various domains and age groups and conducted a literature review that included research from developing and developed countries as available. As the majority of research on education and learning

has been conducted primarily in North America and Western Europe, the research findings are presented along with results from the global consultation, in which 3 out of 4 participants were in the Global South, primarily in Sub-Saharan Africa and South Asia.

### Global Consultation Results

The document "Draft Competencies for Learning Outcomes: Early Childhood, Primary, and Post-Primary" (see annex E) was circulated for public comment on August 2, 2012. More than 500 people in at least 57 countries provided feedback by participating in in-person consultations and/or sending feedback via e-mail.

Several overarching themes emerged from the consultations:

- Respondents were pleased that learning was defined more broadly than literacy and numeracy. However, there was disagreement on how comprehensive the LMTF's recommendations can be at the global level. The competencies were at the same time considered not comprehensive enough for applicability at the country level, and too comprehensive to be applicable at the global level. In particular, teachers and other practitioners advocated a more comprehensive framework while academics and others working at the global level favored a more succinct set of domains.
- There was a request for alignment of terminology and domains across the age groups. In particular, science, critical thinking and physical well-being were perceived to be absent from the primary and postprimary levels. Based on this input, the working groups decided upon the seven domains described above, with the understanding that the capacity and demand for measuring them may vary greatly across age groups.
- A set of "illustrative indicators" were proposed as examples of how learning may be demonstrated within a domain. These indicators were considered too specific and in some cases confusing, and there was a lack of consensus about which illustrative indicators could be applied across language groups and contexts. Therefore, the Secretariat is collecting these comments and will be providing them to the Measures and Methods Working Group, but it has not put them forth in this document. We focus on domains and potential subdomains in this working paper.
- There was much discussion about where the standards should be set. Some felt the competencies were too ambitious for the majority of countries and worried about setting standards where there were not sufficient material and human resources available to meet them. Others felt that the competencies were at the right level.

## Description of the Seven Domains

The seven domains for learning identified by the LMTF are all applicable from early childhood through postprimary schooling, although some domains are more relevant at different learning stages. This section provides a brief description of the domains and subdomains identified by the task force and working groups and then goes into detail on the domains and subdomains at each learning stage (early childhood, primary and postprimary).

| Table 2: Domains and Subdomains of the Global Learning Domains Framework | | | |
|---|---|---|---|
| **Domain** | **Subdomains** | | |
| | **Early Childhood Level** | **Primary Level** | **Postprimary Level** |
| **Physical well-being** | • Physical health and nutrition<br>• Health knowledge and practice<br>• Safety knowledge and practice<br>• Gross, fine, and perceptual motor | • Physical health and hygiene<br>• Food and nutrition<br>• Physical activity<br>• Sexual health | • Health and hygiene<br>• Sexual and reproductive health<br>• Illness and disease prevention |
| **Social and emotional** | • Self-regulation<br>• Emotional awareness<br>• Self-concept and self-efficacy<br>• Empathy<br>• Social relationships and behaviors<br>• Conflict resolution<br>• Moral values | • Social and community values<br>• Civic values<br>• Mental health and well-being | • Social awareness<br>• Leadership<br>• Civic engagement<br>• Positive view of self and others<br>• Resilience/“grit”<br>• Moral and ethical values<br>• Social sciences |
| **Culture and the arts** | • Creative arts<br>• Self- and community-identity<br>• Awareness of and respect for diversity | • Creative arts<br>• Cultural knowledge | • Creative arts<br>• Cultural studies |
| **Literacy and communication** | • Receptive language<br>• Expressive language<br>• Vocabulary<br>• Print awareness | • Oral fluency<br>• Oral comprehension<br>• Reading fluency<br>• Reading comprehension<br>• Receptive vocabulary<br>• Expressive vocabulary<br>• Written expression/ composition | • Speaking and listening<br>• Writing<br>• Reading |
| **Learning approaches and cognition** | • Curiosity and engagement<br>• Persistence and attention<br>• Autonomy and initiative<br>• Cooperation<br>• Creativity<br>• Reasoning and problem solving<br>• Early critical thinking skills<br>• Symbolic representation | • Persistence and attention<br>• Cooperation<br>• Autonomy<br>• Knowledge<br>• Comprehension<br>• Application<br>• Critical thinking | • Collaboration<br>• Self-direction<br>• Learning orientation<br>• Persistence<br>• Problem Solving<br>• Critical decisionmaking<br>• Flexibility<br>• Creativity |

| Domain | Subdomains | | |
|---|---|---|---|
| | **Early Childhood Level** | **Primary Level** | **Postprimary Level** |
| **Numeracy and mathematics** | • Number sense and operations<br>• Spatial sense and geometry<br>• Patterns and classification<br>• Measurement and comparison | • Number concepts and operations<br>• Geometry and patterns<br>• Mathematics application | • Number<br>• Algebra<br>• Geometry<br>• Everyday calculations<br>• Personal finance<br>• Informed consumer<br>• Data and statistics |
| **Science and technology** | • Inquiry skills<br>• Awareness of the natural and physical world<br>• Technology awareness | • Scientific inquiry<br>• Life science<br>• Physical science<br>• Earth science<br>• Awareness and use of digital technology | • Biology<br>• Chemistry<br>• Physics<br>• Earth science<br>• Scientific approaches<br>• Environmental awareness<br>• Digital learning |

The following sections describe the research, policy and consultation evidence for using these seven domains to develop a global learning outcomes framework.

# Physical Well-Being

**Description:** Physical well-being describes how children and youth use their bodies, develop motor control, and understand and exhibit appropriate nutrition, exercise, hygiene and safety practices. For older children and adolescents, the domain of physical well-being 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.

**Policy Rationale:** The UN Convention on the Rights of the Child (CRC) Article 24.1.e affirms that states should take measures "to ensure that all segments of society, in particular parents and children, are informed, have access to education and are supported in the use of basic knowledge of child health and nutrition, the advantages of breastfeeding, hygiene and environmental sanitation and the prevention of accidents." Currently, health and physical well-being indicators (under-five mortality rate and stunting) are used to monitor progress toward EFA Goal 1 (UNESCO 2011). Current efforts to assess physical well-being in early childhood at the global level are conducted through UNICEF's Multiple Indicator Cluster Survey (MICS4) Early Child Development Index (ECDI) and the Early Development Instrument (EDI).

EFA Goal 6 lists life skills as an area for measurable learning outcomes. UNICEF and UIS include health knowledge and skills in their respective definitions of life skills. There are also many country-level policies that promote outcomes in this domain, such as England's Every Child Matters agenda, which identifies five outcomes for children in the health domain: physically healthy; mentally and emotionally healthy; sexually healthy; healthy lifestyles; and choosing not to take illegal drugs.

Recent policy initiatives have recognized the need for individuals to take increasing responsibility for the management of their own well-being—there is recognition that health services must complement the choices and actions of individuals. It is important to note that, while health outcomes are directly and strongly related to income and income distribution (Deaton 2002), many aspects of health and well-being are still in the control of individuals. The ability of individuals to make informed choices can be a significant contribution to raising the general well-being of the population while reducing the fiscal cost of health care systems. Current measurement efforts tend to emphasize health behaviors rather than ensure that people have the information they need to make choices conducive to well-being. It is necessary to understand the knowledge that people possess before it is possible to make sense of their choices and the consequences.

## Physical Well-Being: Early Childhood Level

**Research Rationale:** An estimated 200 million children younger than age five are not fulfilling their developmental potential due to poor nutrition, disease and understimulating environments (Grantham-McGregor et al. 2007). Children who suffer from malnutrition early in life demonstrate lower learning outcomes (Grantham-McGregor et al. 2007; Paxson and Schady 2007). The 2012 EFA Global Monitoring Report (UNESCO 2012) reported that 29 percent of children

under five globally suffer from moderate to severe stunting, with the majority residing in low-income countries and in the Sub-Saharan Africa and South and West Asia regions. Grissmer and colleagues (2010) found that motor skills in early childhood were significant predictors of achievement in reading and mathematics in primary school.

**Consultation Rationale:** The consultation results showed strong support for including physical health and well-being. Several consultation respondents felt that the outcomes related to this domain were considered developmental outcomes and not learning outcomes, but that they still were important indicators of well-being and predictors of later learning ability. Contributors requested a variety of domains to be added that are linked to cognitive development but are actually inputs and not learning or developmental outcomes. Some of these indicators—such as child protection policies, clean water and sanitation—are included in other efforts designed to address early childhood development, including UNESCO's Holistic Early Childhood Development Index (HECDI). The LMTF will continue to explore partnerships to help address critical questions around inputs and context.

**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). |

## Physical Well-Being: Primary Level

**Research Rationale:** Healthy behaviors such as hand washing and other measures to prevent disease have been shown to increase school attendance rates and reduce worm infestations (Brian and Haggard 2003; Kremer and Edward 2001). The International Union of Health Promotion and Education identified six areas of school health promotion that had varying levels of suc-

cessful outcomes on student behaviors: mental and emotional health; substance use and misuse; hygiene, sexual health and relationships; healthy eating and nutrition; and physical activity (St. Leger et al. 2010). The authors reported that while current research examines topic-specific health interventions, a holistic approach to health that integrates multiple topics could be more effective in achieving measurable health and behavioral outcomes.

**Consultation Rationale:** Physical well-being was not included in the draft competencies for the primary level, and many consultees requested that it be added, as healthy habits that are established early in life can endure throughout the lifetime. One consultee stated, "Physical well-being and motor development is also important, given the growing level of obesity. A term such as 'exercise as foundation for healthy living' might indicate the need to lay the foundations creatively for lifelong exercise habits."

**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. |

## Physical Well-Being: Postprimary Level

Research Rationale: Recent years have seen the emergence of a new concept that captures the importance of information related to physical well-being—health literacy (Nutbeam 1999). While the concept originally referred to literacy skills having implications for health, the term has broadened to be used as a metaphor for the knowledge and behaviors that underpin self-management of health. This knowledge includes nutrition, hygiene, disease prevention and child care, but also goes further to include mental health (Jorm 2000).

Research indicates that adolescence is a key time for people to form health behaviors and make decisions with a potential long term impact upon their health. One study argues that this is particularly difficult for youth in developing countries: "The role of the adolescent in developing countries is complex and poorly defined. In a period of unprecedented change, an ur-

gent and comprehensive review is necessary by all sections of society if the health of this group is to improve" (Balmer et al. 1997). A further factor emphasizing the importance of considering health and physical well-being as a learning outcome is the flow of health care workers from poorer to rich countries, creating a difference in available expertise that can have a negative effect on health outcomes in the less-advantaged nations (Packer, Labonté, and Spitzer 2007).

**Consultation Rationale:** There were a considerable number of comments in the consultation calling for an expanded role for health information and behaviors within the competencies. As one consultee pointed out, the postprimary period is "a time when adolescent relationships and life skills can have huge health implications." Another response underlining the importance of this domain indicated that the respondents "did feel that some were missing, in particular health, nutrition and safety awareness, personal hygiene, diet, fitness, HIV/AIDS awareness, responsibility of self care etc., especially in postprimary." There were also very consistent calls for "a much stronger emphasis on important outcomes in the fields of health and nutrition." Several responses specifically called for the inclusion of reproductive health. While there is a need to maintain a clear distinction around the aspects of health that are learned and enacted individually, as opposed to being a result of living conditions or epidemics, the support for the inclusion of physical well-being as a domain of learning was extremely strong.

| Subdomains of the Physical Well-Being Domain for the Postprimary 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. |

# Social and Emotional

**Description:** Social development refers to how children and youth foster and maintain relationships with adults and peers. It also encompasses how they perceive themselves in relation to others. Emotional development is closely linked and refers to how children and youth understand and regulate 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 noncognitive skills.

**Policy Rationale:** The UN Convention on the Rights of the Child (1989) Article 29 makes numerous references to social and emotional outcomes as directions for a child's education, including:

> (a) The development of the child's personality, talents and mental and physical abilities to their fullest potential;
>
> (b) The development of respect for human rights and fundamental freedoms, and for the principles enshrined in the Charter of the United Nations;
>
> (c) The development of respect for the child's parents, his or her own cultural identity, language and values, for the national values of the country in which the child is living, the country from which he or she may originate, and for civilizations different from his or her own;
>
> (d) The preparation of the child for responsible life in a free society, in the spirit of understanding, peace, tolerance, equality of sexes, and friendship among all peoples, ethnic, national and religious groups and persons of indigenous origin.

The DeLors Report, published by UNESCO and the International Commission on 21st Century Education (1996), lists learning to live together as one of the four types of knowledge relevant at the global level. Learning to live together encompasses empathy, curiosity and strong interpersonal skills. As part of UNESCO's HECDI, a review of indicators for measuring progress toward EFA Goal 1, found that "social competence, responsibility, respect, readiness to explore new things, pro-social and helping behaviour, capacity to follow directions, capacity to participate in individual and group work, ability to function in groups and wait for a turn, behaviour management, self-regulatory abilities, capacity to inhibit an initial response, social perception (of thoughts and feelings) and capacity to play alone or with other children" were widely regarded as important for school readiness in children age three to five (Tinajero and Loizillon 2012, 9). While this is not considered UNESCO policy, it represents the best thinking to date on the definitions of school readiness at the global level.

There are several key policies that call for attention to social and citizenship skills in education. "Life skills," named in EFA Goal 6 as a measurable outcome of

quality education, are defined by several organizations in these terms. UNICEF includes "personal skills for developing personal agency and managing oneself, and inter-personal skills for communicating and interacting effectively with others" in its definition of life skills. UIS includes "working in teams, networking, communicating, negotiating, etc." in its definition. Another example is growing global interest in social capital, which can be taken as a measure of a person's embeddedness within a society and has emerging implications for policy (Policy Research Initiative Project 2005).

## Social and Emotional: Early Childhood Level

**Research Rationale:** The development of social and emotional competence is critical to a child's experience in their home, school and the larger community. Social and emotional development is important not only for relationships but also for cognitive development and academic achievement in the early school years (Romano et al. 2010), school completion, early school leaving and social adjustment in later years (Parker and Asher 1987). If a minimal level of social competence is not achieved by the age of six, it is probable that the child will be at risk for any number of social challenges and obstacles for the remainder of his or her life (Copple and Bredekamp 2009; Ladd and Dinella 2009). Early childhood socioemotional difficulties are often precursors to diagnosable mental health problems in adolescence (Essex et al. 2009). A gradient in composite measure of child socioemotional competence in early childhood (self-control) predicted children's socioeconomic status, health, marital status and criminal conviction in adulthood (Moffitt et al. 2011). Although the indicators for social and emotional development may vary depending on the age group or the cultural context, a number of general domains can be adapted globally. The subdomains listed below are research- and evidence-based and have been used in various international contexts and curricula.

**Consultation Rationale:** Most contributors were strongly supportive of the social and emotional domain in early childhood. They suggested a variety of subdomains and skills that the working group has attempted to capture below. "Family/cultural/religious knowledge and identity" was included in the draft competencies, but contributors were divided on how these would be measured and whether they should be included, especially religious knowledge. These concepts are included in "self- and community-identity" in the current version.

| 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 refers 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 refers 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 decisionmaking. 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. |

## Social and Emotional: Primary Level

**Research Rationale:** Research shows that social and emotional development is important for relationships, cognitive development and academic achievement in the early school years (Romano et al. 2010), and predicts school completion, early school leaving and social adjustment in later years (Epstein 2009; Parker and Asher 1987). According to CONFEMEN (1995), alongside the acquisition of academic knowledge (reading, writing, numeracy and problem solving), schools must help students develop social skills, including interpersonal skills, the ability to change, the acquisition of ethical values and cultural norms, and the ability to resolve conflicts and coexist with others. These skills are both cognitive acquisitions and transferable skills to other life situations.

Social skills and abilities form a foundation for how well one succeeds in life and uses skills in other domains. Such skills are in most instances acquired through a socialization process that happens in social organizations and institutions, such as the family, the household, religious institutions, schools and the workplace. In addition to being learned naturally in these environments, these skills can also be taught and learned (Ross and Spielmacher 2005; Thompson and Goodman 2009).

**Consultation Rationale:** There was agreement among those consulted that social and emotional competence was critical in its own right and also in how it is related to other aspects of learning. One consultee stated the importance of integrating social and emotional learning with other content areas: "The material taught must be meaningful, understandable, and relevant to the child's life outside the school fences. This will make education more meaningful to the life of the graduates. The skills imparted should help our future graduates function more effectively in tomorrow's world. Democracy is gaining mileage in most of the countries of the world. Citizens of a democratic world need the ability to make sound, moral judgments, to think critically and to defend one's position rationally. All these reinforce the importance of the scholastic and ethical aspects of teaching thinking within the education system."

| 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, decisionmaking, assertiveness, peer resistance, self-awareness, negotiation, friendship, self-esteem, advocacy for inclusiveness and nondiscrimination, and emotional intelligence. |
| **Civic values** | Civic values refers 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 mechanisms to respond to traumas and other negative environmental factors. |

## Social and Emotional: Postprimary Level

**Research Rationale:** There is an increasing recognition of the roles of social as well as emotional competencies for career success, fulfillment of civic responsibilities and effective family living. However, owing in part to ease of measurement, the cognitive domain has continued to attract more research efforts. The fluidity and complexity of the affective domain present significant measurement challenges in workplace, civic and leadership studies, with the result that it remains a weak link in the education of the whole person. There is a demonstrable complexity of varied influences on the development of civic competencies across countries (Hoskins et al. 2011) and prerequisite soft skills for different work/social settings (Harris and Rogers 2008). These complexities and measurement challenges lend credence to multidisciplinary approaches and mixed research methods to pursuing studies of social and emotional issues.

Globalization and the use of the Internet have highlighted the diversity in social/emotional relationships among the world's peoples and concurrently promote acculturation of the population exposed to the Internet. There is abundant evidence to show the influence of social networks on the socialization process, civic engagement (Facebook, Twitter, YouTube, LinkedIn, etc.) and workplace networking (Coulby 2011; Blais et al. 2008; Ono 1996). The more accessible the Internet becomes globally, the more important it will be to conduct research to determine how communities will respond to a heavy dose of social exchanges among different cultures, since it is usually the privileged and the leadership of most communities that experience external contacts. In this case, the leaders will have to decide how social issues—such as gender in the workplace, changing family structure and emotional intelligence for career success—will play out in the struggle for organizational, communal and global identity.

As complex as social and emotional issues are in relation to any global standards, Gardner's theory of multiple types of intelligence (Williams 2007), especially intrapersonal and interpersonal intelligence, will help educators and researchers conceptualize how best to train for these competencies. In a world of increasing social intricacy and knowledge explosion, training the workforce as well as the citizenry on how to develop social and emotional maturity/intelligence has never been so imperative for career success and sustainable family life.

**Consultation Rationale:** There was strong support in the consultation for the view that people need to understand their place within, and responsibility to, society. This responsibility will sometimes include exercising leadership. One respondent included a considerable list of potential subdomains, including "critical thinking and decisionmaking, ethical values and cultural norms, human rights and responsibilities and humanitarian norms and respect for diversity/coexistence." There was a great deal of interest in finding a way to include the management of human and social relationships as a significant learning outcome, though there was also a cautionary note that "social and civic awareness competencies may be particularly difficult areas in which to develop consensus on measures."

A number of respondents made the point that individual engagement is an important precursor of social engagement, and that people need to have a mature and positive view of the self. Accompanying this idea is the notion of aspiration for a better quality of life for the individual and more broadly, which can help to provide a basis for social and emotional interactions. Overall, consultation underlined the importance of this domain very clearly, while recognizing the difficulty of conceptualization and measurement that it presents.

| Subdomains of the Social and Emotional Domain for the Postprimary 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, either political, religious or cultural. Ethical values refers 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. |

# Culture and the Arts

**Description:** The arts in the realm of education are often described as creative arts expression, and can include activities from the areas of music, theater, dance or creative movement, and the visual, media and literary arts. The foundation for learning in history and social science is built on children's cultural experiences in their families, school, community and country.

**Policy Rationale:** Although the arts are critical to education strategies, the frameworks and policies, research and resources devoted to arts education and integration have received less attention as compared with other domains. UNESCO's *Road Map of Arts Education*, formed at the World Conference on Arts Education in Lisbon, March 6–9, 2006, was an international attempt to integrate creative and cultural development into global education policies and to draw attention to arts education. The domain of arts and culture is critical to other global education initiatives, as can be seen through direct references in policies and frameworks from EFA to the CRC framework, to UNESCO's *Declaration on Cultural Diversity* (2001). 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.

Cultural and artistic content and approaches in learning are critical to achieving global education policies such as the EFA and CRC frameworks, as well as UNESCO's *Universal Declaration on Cultural Diversity* (2001). EFA Goal 6—*Improving every aspect of quality education, and ensuring their excellence so that recognized and measurable learning outcomes are achieved by all, especially in literacy and numeracy and essential lifeskills*—is supported by a number of requirements that are well aligned with arts education's evidence-based outcomes, including: motivating students (requirement 1), providing teachers with active learning techniques and approaches (requirement 2), enhancing the quality and relevance of teaching and learning materials and environments (requirement 3), building on the experience of local cultures and experiences of teachers and learners (requirement 4), promoting an environment that is culturally sensitive and safe (requirement 6), and fostering respect and a means of engaging local communities and cultures in the education community and process (requirement 8) (UNESCO 2000).

Cultural and arts education programming also supports CRC's Articles 29 and 31 (United Nations 1989).

> Article 29: (a) The development of the child's personality, talents and mental and physical abilities to their fullest potential;
>
> (c) The development of respect for the child's parents, his or her own cultural identity, language and values, for the national values of the country in which the child is living, the country from which he or she may originate, and for civilizations different from his or her own;

(d) The preparation of the child for responsible life in a free society, in the spirit of understanding, peace, tolerance, equality of sexes, and friendship among all peoples, ethnic, national and religious groups and persons of indigenous origin.

Article 31: State parties shall respect and promote the right of the child to participate fully in cultural and artistic life and shall encourage the provision of appropriate and equal opportunities for cultural, artistic, recreational and leisure activity.

Finally, cultural and arts education have been integrated into national curricula and education policies as a means of promoting social and cultural pride; teaching history and social studies from a multicultural context; fostering understanding, respect and tolerance among children and youth; encouraging citizenship and civic engagement; and promoting peace. Cultural and artistic learning opportunities and policies are critical in all countries, but they are especially critical to educational empowerment in areas where historic exclusion or a differentiated treatment of cultural or ethnic groups has characterized the education system. For example, in Tanzania, instituting a national cultural policy after independence promoted diverse dance, theater, literature, music and other arts traditions in primary school curricula, replaced imposed colonial beliefs and fostered an appreciation and respect among cultures and people that still exist today.

The DeLors Report's concept of learning to live together (UNESCO 1996) is developed by gaining an understanding of others and their history, traditions and spiritual values and, on this basis, creating a new spirit, which, guided by a recognition of our growing interdependence and a common analysis of the risks and challenges of the future, would induce people to implement common projects or to manage the inevitable conflicts in an intelligent and peaceful way. The concept of the fourth pillar, learning to be, relates to the individual's ability to develop and actualize his or her potential and achieve established goals.

## Culture and the Arts: Early Childhood Level

**Research Rationale:** Arts and culture are critical to the early development of children, as they have intrinsic value and promote development in other domains. Children learn language patterns and foundations through song and rhymes. They stimulate their brains and cognitive development through cross-lateral movements, and they develop gross and fine motor skills by playing instruments or painting with their fingers. Children as early as birth start to engage their senses and bodies when exposed to music, movement or other art forms. As soon as children begin to develop language skills, they increasingly begin to respond to and evaluate art, and to use artistic forms, such as theatrical role-playing, to solve problems and relate to others. Caregivers, educators, researchers and policymakers have promoted the arts in early childhood programming, as they increasingly recognize the importance of integrating arts into learning.

Arts and cultural activities engage children cognitively, physically, socially and emotionally through their bodies, minds and senses. As early as birth, children begin to participate experientially in the arts by observing, listening and responding, and eventually, as they start preschool, they can begin to evaluate the arts through discussions and sharing thoughts and opinions. The arts also provide a means whereby skills and learning

in other domains can be integrated, and thus give children who may have language, physical or other developmental challenges an important medium in which to express themselves and to engage with the activities around them.

Research on the importance of arts education in early childhood development has been largely dominated by scholars in middle- to high-income countries—such as the United States, Canada, Australia, Western Europe, China and Japan—and has been conducted in countries or contexts that have the resources to invest in arts evaluation, research and programming. The majority of arts education research is qualitative, although quantitative studies have increased in recent decades. In the United States there are two notable compilations that present a multitude of research on how participation in the arts is connected to various domains of educational development—*Critical Links: Learning in the Arts and Student Academic and Social Development* (Deasy 2002), and *Champions of Change* (Fiske 1999)—which both explore learning from the early childhood to postsecondary levels. This research is discussed in greater detail in the Primary Arts and Culture section.

A few other notable studies, such as *Learning, Arts and the Brain: The Dana Consortium Report on Arts and the Brain* (Asbury and Rich 2008), have explored participation in the arts from children's early years to higher educational performance from the perspective of cognitive neuroscientists. For example, the Dana study found "tight correlations" between those involved in various arts activities and those who are able to master skills in language and mathematics. The region of the brain responsible for verbal memory, especially the recall and retention of oral words, is developed through music, which serves as a later foundation for retaining information from other subjects and domains. Another study found that music students tested for verbal memory in language exhibited a greater recall for words as compared with nonmusic (Ho et al. 2003). Persistence, motivation, commitment, creative thinking and originality are also traits found in young people who had exposure to and engagement with the arts (Scott 1992; Minton 2002).

**Consultation Rationale:** Learning about and through the arts was noted as important to the early childhood development of children from birth through school entry. The subdomain "heritage culture" was suggested by one consultee, and was described as follows: "Participate in heritage cultural activities, listen and respond to traditional stories. Take part in traditional singing, dancing, games and making crafts." Aspects related to culture and artistic expression were initially included under the social and emotional domain, but consultation feedback suggested that culture and the arts be treated as a separate domain.

| 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. |

## Culture and the Arts: Primary Level

**Research Rationale:** Arts education can be (1) an approach, or link, through which other curricula, such as math or science content, are taught; or (2) the direct teaching of individual art forms (e.g., dance, theater, music, visual arts or media arts) (UNESCO 2006, 8). In the first approach, a plethora of research shows that engagement in creative and artistic learning can positively affect both academic achievement and the social development for children and youth. The *Critical Links* study compendium published by the Arts Education Partnership (Deasy 2002) presents 65 research- and evidence-based examples where student participation in artistic learning activities—namely, theater/drama, dance, visual arts, music and multiarts (i.e., media arts)—yielded positive student performance and skills development in reading, math, critical thinking and social sciences. The compendium also found that arts education opportunities contributed to student motivation to learn and positive perceptions of the school environment.

The direct teaching of artistic and cultural forms can include (1) engaging in creative and artistic practices, (2) learning about artistic works and (3) directly experiencing artistic works through authentic contact. Each of these pedagogical areas helps build appreciation for artistic and cultural forms and promotes creative exploration and expression. Through cultural and artistic studies, learners develop a sense of cultural identity as an individual or community, a sense of citizenship or civic participation, social responsibility, values and expression of empathy toward others, a more positive self-image, and democratic or cultural pluralism (Dube and Moffat 2009).

The Commonwealth's *Civil Paths to Peace* (Sen et al. 2007) further suggests that education can be instrumental in promoting respect and understanding and deals with the individual's ability to emphasize, participate in the political sphere and understand and defend their own right and the rights of others.

Direct teaching of arts education in primary schools builds appreciation for the cultural and artistic expressions of others, gives young people the opportunity to create their own works and provides children with a foundation for responding and evaluating other experiences, ideas and thoughts around them. Arts education, as an approach to teaching other academic subjects and learning outcomes, is also critical to the development of skills in the cognitive, social and emotional development, literacy and communications, and inquiry realms of children. Teaching through and about culture and artistic forms also lays a foundation for children to understand human relationships and the world around them, and serves as a medium through which they can reflect on who they are and who they want to become as a person or part of society. "Awareness and knowledge of cultural practices and art forms strengthens personal and collective identities and values, and contributes to safeguarding and promoting cultural diversity" (UNESCO 2006, 6).

**Consultation Rationale:** Many of those providing feedback pointed out the fact that culture and the arts were missing in primary. One consultee noted the linkages between learning in this area and precolonial learning: "As Ali Abdi (2011) notes, for thousands of years prior to the arrival of the colonists, the primary mode of communication for many cultures had a stronger base in orality, as opposed to textuality. In many of these cultures, the arts were valued in communities and society for their richness in communicating messages and for their power to draw people together, 'touch the intimate senses', deliver messages and stimulate community dialogue and debate."

| 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. |

## Culture and the Arts: Postprimary Level

**Research Rationale:** The DeLors Report (UNESCO 1996) lists learning to live together and learning to be as two key fundamental pillars of knowledge required for education in the 21st century. Learning to be deals with the individual's personal "development and fulfillment, the richness of his/her personality and the complexity of his/her forms of expression" as it relates to is ability to creatively dream. *Civil Paths to Peace* (Commonwealth Secretariat 2007) further suggest that education can be the instrumental in promoting respect and understanding and deals with the individual's ability to emphasize, participate in the political sphere and understand and defend their own rights and that rights of others.

**Consultation Rationale:** Several consultees stated that culture and the arts was a missing area for the postprimary level. One group recommended, "We would also like to see the Interaction domain in the Post-Primary replaced with the Social and Civic Awareness Domain from the Primary level. An expansion of Ethical Values, Cultural Norms, Conflict Resolution, Coexistence, Arts, Creativity, Music, Drama, National/International Expectations, Social responsibility, Environmental Awareness and appreciation."

| Subdomains of the Culture and the Arts Domain for the Postprimary 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. |

# Literacy and Communication

**Description:** The domain of literacy and communication includes those 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.

**Policy Rationale:** Worldwide, literacy is one of the primary goals of education. Most children are exposed to language and written materials prior to school entry, at varying levels. There has been a strong emphasis on children's use of their mother tongue in early education, according to the Declaration on the Rights of Persons Belonging to National or Ethnic, Religious and Linguistic Minorities (United Nations General Assembly 1992). In some instances, this policy can be difficult to implement because some languages have little or no script and limited vocabularies. In addition, the majority of children in the world grow up in homes and cultures where multilingualism is the norm, making the language-of-instruction choice complex.

Language and literacy development is widely considered part of a comprehensive early childhood program, which is the focus of EFA Goal 1. As part of UNESCO's HECDI, a recent review of indicators for measuring progress toward EFA Goal 1 found that "knowledge of letters, language and symbol recognition, basic literacy, [and] interest in literacy" were widely regarded as important for school readiness in children age 3–5 (Tinajero and Loizillon 2012, 9). Current efforts used to measure young children's language and literacy at the global level include UNICEF MICS and the EDI, among others.

EFA Goal 6 lists literacy as a measurable learning outcome all children should demonstrate. The GPE has engaged in a consultative process to identify indicators for meeting its strategic goals in GPE countries. Basic literacy and numeracy in the early grades have been proposed as indicators for Strategic Goal 2, Learning for All. These policies are also demonstrated through the resources devoted to measuring literacy at the primary and postprimary levels. The overwhelming majority of multi-country assessments focuses on basic literacy skills in primary school (PASEC, SACMEQ, LLECE, PIRLS, Pre-PIRLS, ASER, Uwezo, EGRA, Literacy Boost). Beyond the primary level, the Program for International Student Assessment (PISA) measures reading literacy in 65 (mostly middle- and high-income) economies through questions regarding text format, reading processes (aspects), and situations (OECD 2009).

In the last twenty years there have been several attempts to create global measures of adult literacy, including the International Adult Literacy Survey (IALS), UNESCO's LAMP project and the upcoming Programme for the International Assessment of Adult Competencies (PIAAC). Evidence makes 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. One estimate sug-

gests that this may affect nearly one billion illiterate youth and adults globally (UIS 2011). In Europe, 1 in 5 youth and adults may have literacy abilities that are inadequate for sustained economic and social development (European Union High-Level Group of Experts on Literacy 2012). In the United States, some 93 million, age 16 and older, can perform only basic literacy tasks (National Center for Education Statistics 2009).

## Literacy and Communication: Early Childhood Level

**Research Rationale:** The process of becoming literate begins when children are infants. Language development prior to beginning school serves as the backbone of later literacy development. The core of language acquisition occurs between 18 and 48 months, with children acquiring much of the necessary basic phonology, syntax, and vocabulary (Herschensohn 2007; Gleason and Ratner 2009). Research on a variety of languages in the ability to discern language-specific phonemes supports the idea that infants gain these skills in their native language(s) prior to 12 months of age (Kuhl 2004). From about six to twelve months of age, infants detect and use phonotactic patterns—pauses, patterns of sequential phonemes (e.g., in English, the consonant cluster "ng" is rarely found at the beginning of words, whereas this is a common phoneme combination in African languages), as well as differentiation of syllables, prosody, and stress—to determine word boundaries. Children's early exposure to vocabulary in everyday conversations with caregivers and those individuals (in many societies, care-giving is not limited to adults; Ochs and Schieffelin 2011) who participate in their lives sets a trajectory that is difficult to alter later in childhood. By some estimates, children may vary in the number of words that they have been exposed to by age four by as much as 30 million words, with children in lower socio-economic status homes at the lowest end of this estimate at 13 million and children at the higher end of socio-economic status at about 45 million (Hart and Risley 1995). The actual number of vocabulary words recorded for these children at age three varies as well; children from upper socio-economic homes may have double the number of unique vocabulary words as those in the lowest group, similar statistics apply to receptive vocabulary in some developing countries (Paxson and Schady 2007). The rate of vocabulary acquisition at age three predicts vocabulary knowledge, language development, and reading comprehension at ages 9-10 (Hart and Risley 2003). More importantly, Hart and Risley (1995) also found that for children in the poorer socioeconomic class who had good parenting with the same vocabulary scores as the children in the more affluent class, the test scores at age three and age nine were as good as the children in the high socioeconomic group. Thus, despite its association with socioeconomic status, it is the exposure to richness of spoken language that makes a difference in children's lives. Highlighting this issue in the standard puts ever more emphasis on its importance.

**Consultation Rationale:** There was general consensus among the working group members and consultation contributors that a solid foundation in language and literacy in early childhood supports later learning. Contributors emphasized that learning should occur and be measured in mother tongue language. Oral language development (speaking, listening, and understanding) was consistently emphasized as being important at the global level, but the degree to which written language could be emphasized in early childhood varies widely by language and script.

| Subdomains of the Literacy and Communication Domain for the Early Childhood Level[3] | |
|---|---|
| **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. |

## Literacy and Communication: Primary Level

**Research Rationale:** 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. The strength of a student's reading skills in early primary school can be predictive of his or her ability to read 5 or even 10 years later (Scarborough 2001; Cunningham and Stanovich 1997; Juel 1988). This is largely due to the fact that reading skills are self-reinforcing—children who are strong readers read more and encounter more novel words. Through wide reading, children develop a larger vocabulary that in turn helps them read and understand new material (Aga Khan Foundation 2010; World Bank 2011).

Children's exposure to oral and written language happens in the home and community, in preprimary programs and in primary school. A child with literate parents, books in the home, and access to a quality preprimary program is much more likely to be ready to read upon primary entry than a child without these opportunities. However, even children who have had very limited or no exposure to print will have developed the language skills listed above such as phonological awareness, vocabulary, and knowledge of the grammar and discourse rules of the language. These skills contribute to the development of early reading. However, this advantage may be lost if children's first encounter with print is in a language they do not speak or understand. Although, children can acquire basic word level skills in the first two years of schooling even in languages they do not speak (Chiappe, Siegel, and Gottardo 2002; Chiappe, Siegel, and Wade-Woolley 2002; Geva and Yaghoub-Zadeh 2006), to fully develop reading skills, including the comprehension skills needed to read to learn, children must also be proficient in the language in which they are learning to read. 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 (Ball 2011). Therefore, to the extent possible, children's introduction to print should be in a language they speak.

Across languages, learning to read follows a similar trajectory (Goswami 2006). What varies is the length of time needed to acquire basic literacy skills such as sound/symbol relationships. The characteristics of the language influence how fast a child learns to read and write. An orthography is a standard system for using a particular writing system. Some languages, such as Spanish, Russian, and most Bantu languages have a relatively transparent orthography (Lyytinen et al. 2009). In a fully transparent orthography such as Finnish there is a one-to-one or almost one-to-one correspondence between the smallest units of the language—that is, phonemes and letters in both directions (reading and spelling)—while the connections may be not as fully consistent in one direction (e.g., writing in German). In English the nontransparency reaches it extreme among alphabetic writing systems. It has 44 sounds and more than 100 spellings to represent them (Blevins 1998). Orthographies such as these—which are also called opaque writing systems—take longer to learn given the various rules of the language a child has to learn. In languages such as English, Mandarin and French, some of the sounds are represented by more than one symbol, and some symbols represent more than one sound. Opaque orthographies such as these take longer to learn given the various rules of the language a child has to learn (Seymour 2006). Alphasyllabic and syllabic languages will also take longer to teach because children have to learn more symbols. However, despite these differences and, even before they know all the sound symbol relationships, children will be able to learn some sound/symbol relationships, to read a few words, and even simple sentences in the first year of schooling.

Once children can read a few words and have a reliable strategy for reading new words, they will need opportunities to apply the skills they are developing in order to develop reading fluency. 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. 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.

Reading comprehension is impacted by a child's vocabulary, background knowledge, and ability to use comprehension strategies. Additional variation will occur when children learn to read in a language they do not speak or in which they have limited proficiency. These differences are more noticeable as children shift from learning to read to reading to learn because adequate reading comprehension depends on a person already knowing the meaning of 90 to 95 percent of the words in a text (Nagy and Scott 2000). Despite these differences, learning to read in the first few years of primary school is considered an achievable goal for the majority of children, given adequate instructional and material supports (Gove and Cvelich 2010; Center for Universal Education at the Brookings Institution 2011).

**Consultation Rationale:** Consultees felt strongly that literacy and communication were critical skills in primary school, and that learning to read and communicate underpin later academic skills. However, there was much disagreement about when the skills could be expected. For example, some working group members felt strongly that children should be able to master the sounds and symbols of the language of instruction (i.e., learning the letters of the alphabet in alphabetic script) by the end of primary year 1. This was put forth as an illustrative outcome in the draft competencies. Proponents of this approach argued that this very basic skill was still not being achieved by millions of children, and with adequate instruction children should be able to read words and simple sentences even if they have not learned all the sound/symbol relationships. Others argued that while this standard is applicable to alphabetic languages, a child learning Mandarin would

not be able to master all of the sounds and symbols of the language at the end of primary year 1. As one consultee stated, "We cannot expect the achievement of the same competencies for a child who is learning in their mother tongue as a child who goes to school without understanding a word of what the teacher is saying. . . . It is not the same to learn the 26 letters of the Roman alphabet as learning the Bengali alphabet which can have up to 350 different symbols with vowels, consonants, conjuncts, and modifiers."

Further, many of those who consulted on the competencies felt that setting a standard based on the language of instruction could discourage mother tongue instruction. As one consultee said, "My greatest concern is over how these will get turned into assessment and therefore into curriculum. I could see these indicators squeezing out support for L1 literacy and I could also see them lending themselves to literacy assessments that emphasize phonics and [phonological awareness] much more than comprehension, at least in early grades, and I think that would be a mistake. I could also see them emphasizing reading to the exclusion of writing and oral development, which again I believe is a mistake." Other working group members pointed out that by providing greater clarity around mother tongue instruction and the transition of skills across languages, it was possible to set standards without discouraging mother tongue instruction.

| **Subdomains of the Literacy and Communication Domain for the Primary Level[4]** | |
|---|---|
| **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) |

## Literacy and Communication: Postprimary Level

**Research Rationale:** Researchers are drawing renewed attention to the essential role of literacy in the lives of youth (Alvermann and Wilson 2007; Biancarosa and Snow 2004) and adults (Richmond, Robinson, and Sachs-Israel 2008). For instance, 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 (Graham and Perin 2007; Sum et al. 2007). Adolescents with low levels of literacy will be at a great and increasing disadvantage in today's society and modern workplace (Schleicher 2010). In a world driven by information and knowledge, their skill deficiencies will limit access to the full range of opportunities enjoyed by their more literate peers (Bertschy, Cattaneo, and Wolter 2009). Thus, the quality of literacy competence individuals develop as youth will impact their competence in personal, occupational and community life as adults.

The new skilled worker needs adaptable reading, writing and problem-solving capabilities, as well as the ability to communicate in meetings and compose reports and other job-related texts (Askov and Gordon 1999). These essential reading, writing, speaking and listening skills are developmental in that the ability to make meaning from and with text, as well as communicate and expand one's knowledge continues to increase throughout life (OECD 2010). It is important to emphasize, therefore, 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 (Sturtevant et al. 2006; Sum 1999). 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 (Gee 2001). 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.

**Consultation Rationale:** This was one of the most universally accepted of the domains, and there was very little indication that it should not be a key domain. There were a number of points raised about the need to ensure that communities with multiple languages were included, as well as indications of the complexity of languages and literacy as a tool to gain information, the critical skills to comprehend and challenge that information, and the ability to produce information reflecting the individual's experience. Given the range of measures already in operation within this domain and the centrality of these abilities this is already widely seen as a key domain.

| Subdomains of the Literacy and Communication Domain for the Postprimary 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 texts may include books and other paper materials and computer/digital media. |

# Learning Approaches and Cognition

**Description:** Learning approaches and cognition refers to engagement, motivation, and participation in learning. It 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. Learning approaches include many of the skills considered "executive functioning," which refers to inhibitory control, working memory and the ability to organize, plan and reflect on one's learning. 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.

**Policy Rationale:** As part of UNESCO's HECDI, a recent review of indicators for measuring progress toward EFA Goal 1 found that "analytical skills and mental problem-solving, [and] concentration and memory" were widely regarded as important for school readiness in children age three to five (Tinajero and Loizillon 2012, 9). Two widely used measures of early childhood development, the MICS ECDI (UNICEF) and the EDI, measure aspects of learning approaches and cognition. Education for All Goal 6 lists life skills as a measurable learning outcome. UNICEF and the UIS, among others, define life skills to include thinking and problem solving.

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. It has come to be recognized as "learning to learn" within discussion of the knowledge economy. Using slightly different language, the DeLors Report (UNESCO 1996) lists learning to know as one of the four types of 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. Learning to learn allows individuals to benefit from the opportunities education provides throughout life, and potentially adds to their adaptability and resilience to change.

International comparative studies are beginning to take learning approaches into account. PISA includes a questionnaire administered to school leaders. This "context questionnaire" includes questions on students' attitudes toward learning, study habits, interest, motivation, and engagement, as well as their relationships with teachers (OECD 2009). TIMSS, which can be administered in grade 8, also includes comprehensive context questionnaires. Within these areas the study is moving beyond learning of content in an attempt to understand how young people learn to work with information, and what factors may support them in that learning. Providing support for people to discover and develop strategies to learn will have many benefits, including economic innovation, more informed personal decisionmaking, an enhanced quality of life, and easier access to human culture generally.

International surveys are being implemented to assess the distribution of adults' cognitive and problem-solving skills within and across nations (OECD 2012), though these efforts are limited to the most developed economies. It would be valuable to have a framework for examining an expanded set of cognitive and

problem-solving skills relevant and responsive to the Global South. At the postprimary level, the skills and abilities in this domain are not tied to particular economic or employment circumstances, but are aimed instead at the adaptability required in fast-evolving circumstances such as global urbanization and industrialization. These skills can be seen as underpinning entrepreneurship and initiative in both economic and social contexts.

## Learning Approaches and Cognition: Early Childhood Level

**Research Rationale:** 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 participants in their own development exploring the environment, learning to communicate and building ideas and theories about how things work (Vygotsky 1997; Ausubel 1963; Piaget 1952; Bandura 1986; Rogoff et al. 1993). Children will 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 despite ever-present distractions because these skills undergird the deliberate, intentional, goal-directed behavior that is required for daily life and success at school and work (Center on the Developing Child at Harvard University 2011). 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 (Raver et al. 2005; Alexander, Entwisle, and Dauber 1993; McClelland, Morrison, and Holmes 2000; Yen, Konold, and McDermott 2004; Howse et al. 2003; Brock, Jimerson, and Hansen 2009). A growing body of research points to the importance of learning approaches, attention skills, and executive functioning for children's academic success. 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 (Clancy 2002). Attention skills in children beginning school are related to math and language scores over time (Duncan et al. 2007). Learning approaches defined as a combination of persistence, emotion regulation, and attentiveness in kindergarten contribute to children's academic skills in reading in math as far as Grade 5, regardless of ethnic background and socio-economic status (Li-Grining et al. 2010).

There is a strong base of evidence demonstrating that early cognitive abilities are the best predictors of later academic skills (Duncan et al. 2007). While young children are in many ways concrete thinkers focused on the present, they also have considerable cognitive skills that allow them to gain new knowledge, reason about events, and solve new problems by adapting known solutions. Reasoning and problem solving tend to be domain-specific, and may vary in sophistication depending on the knowledge base of the domain. So, for instance, if a child is highly familiar with trains, she may be able to infer that if the engine is big, then it must be pulling a lot of cars (an alternative rural example is if the mama goat is getting large, she will soon have more baby goats). Reasoning generally involves inferring, going beyond current knowledge to develop new conceptual understandings (Flavell, Miller, and Miller 2001, 149).

**Consultation Rationale:** In the draft competencies, this domain was separated into two domains: "Approaches to learning" and "Cognition and general knowledge," which included early numeracy and early science competencies. The feedback received suggested that cognition skills such as reasoning, problem solving, and early critical thinking skills should be separated from the content areas of numeracy and science as they apply to broader areas such as social situations and language.

The term “approaches to learning” in the draft competencies is used in the field of early childhood but was not easily understood by many of those providing feedback. The subdomains “initiative” and “leadership” were thought to be especially culturally-laden, and contributors felt they should be balanced with skills such as cooperation, teamwork, and anticipating others’ needs.

| 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. |

## Learning Approaches and Cognition: Primary Level

**Research Rationale:** 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 (Halford and Andrews 2006).

Studies have consistently found positive associations between measures of children's ability to control and sustain attention with academic gains in the early elementary school years (Raver et al. 2005; Alexander, Entwisle, and Dauber 1993; McClelland, Morrison, and Holmes 2000; Yen, Konold, and McDermott 2004; Howse et al. 2003; Brock, Jimerson, and Hansen 2009). Executive functioning skills continue to be important this age. 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 and less likely to receive special education services (Duncan and Magnuson 2011).

According to the revised Bloom's taxonomy, which describes educational outcomes (Anderson and Krathwohl 2001), cognition begins with using memory to recall factual knowledge, and then progresses to constructing meaning and then applying knowledge to new situations. Cognition and problem solving in primary school are usually measured through understanding texts and application to problems in the areas of numeracy and science, but can also be expanded to a variety of situations, for example social problems.

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. Domain knowledge allows children to pay attention to salient details (Siegler 2006), enabling them to understand the problem and arrive at solutions more efficiently.

**Consultation Rationale:** The domain of learning approaches and cognition was not included in the draft competencies for the primary level. However, some consultees called for its inclusion. One consultee stated, "'Study Techniques' should be considered in last two years of primary school and all years at the secondary level. In many countries it is critical to the path from primary level to secondary." There was some support for a separate cognition domain at the primary level. Others felt that learning outcomes in this domain would be measured through their application to other domains (e.g., mathematics, science).

| 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.). |

## Learning Approaches and Cognition: Postprimary Level

**Research Rationale:** Research into the effects of education shows that assessment of measured cognitive skills is a far better predictor of economic outcomes (in terms of returns to education) than length of school attendance. Cognitive skills are related to individual income, the strength of the economy, and the equity of income distribution within a country (Hanushek and Woessmann 2008). Examination of the higher-order skills of experienced decisionmakers points to flexibility and critical thinking skills as key components of the procedures they apply (Helsdingen, Van Gog, and Van Merriënboer 2009). Occupations are becoming increasingly reliant on a cognitively flexible and adaptable workforce (Billett 1998; Smith 2003).

There is evidence that poverty and cognitive development are linked, though the extent of this link is not yet fully known. Hanushek and Woessmann (2008, 658) claim that "the current situation in developing countries is much worse than generally pictured on the basis just of school enrollment and attainment," when cognitive skills are examined apart from years of schooling and similar measures. There is complementary evidence from rural Pakistan that economic deprivation accounts for a significant portion of observed cognitive difference, though the authors argue that "simple as-

sociations of cognitive achievement with income would overstate substantially, at least by a factor of two, the probable impact of direct income increases on cognitive achievement" (Alderman et al. 1997, 117). One key aspect of cognition is cognitive flexibility, encompassing "processes such as divided attention, working memory, conceptual transfer, and feedback utilization" (Clearfield and Niman 2012, 29).

Research does support the inclusion of cognitive and problem-solving considerations in a learning outcomes framework. If these capabilities are only partly explained by income and other environmental variables, then a portion of them must be learned (Helsdingen, Van Gog, and Van Merriënboer 2009). 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.

Older models of learning, which view knowledge as something to be acquired through learning, have been largely superseded. More than 50 years ago, there was a growing recognition that learning was a multidimensional phenomenon, with one highly influential framework (Bloom et al. 1956) dividing learning into three domains (cognitive, affective and psychomotor) that in turn were divided into less and more sophisticated levels of learning. Within the affective domain, three of the levels refer to a person's reaction to new knowledge in terms of responding, valuing and organizing that knowledge. This work led to a recognition that knowledge is not acquired but created through learning, a view called constructivism.

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 implies that they must recognize and respond to their own preferences (Roberts 2010). 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.

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. One of the key concerns is whether individuals have learning-approach or learning-avoidance goals (Elliot 1999), and one aspect of ensuring that people deal creatively with new circumstances is promoting a positive orientation toward learning. 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.

**Consultation Rationale:** There was strong support for the ability to learn across the life span—in both formal and nonformal contexts—to have a high profile among the domains. One respondent stated that the "'approach to learning' domain should cut across all three stages. It is a domain that partly captures the 'essential life skills' learning outcome (e.g., critical thinking, creative thinking, problem solving, interpersonal skills/cooperation). It also allows for a link to content subjects that various countries may have (e.g., science, history) without necessarily incorporating all those subjects into this metrics framework." This matches well with the expanded view of learning reflected in the subdomains, which emphasizes collective and collaborative learning.

Learning orientation is a critical aspect of many other domains and a wide range of life activities, and links to other key knowledge strategies: "Research as a tool

and as an ongoing process and really critical to lifelong learning needs to be captured or infused in all the given domains." This again supports the inclusion of a multidimensional view of learning as a key outcome for human development.

Many respondents supported a general problem-solving category, and others stated that problem solving should be seen as an outcome of the various domains rather than as a domain in its own right. Cognition did not receive universal support; in many cases, there were comments that cognitive measures could drive out and obscure the noncognitive dimensions of learning. Overall, this domain does allow for the capture of a range of outcomes that were considered relevant and necessary to include, and on that basis it has been decided to include it in the framework. In order to recognize broader comments, however, it must be emphasized that cognition and problem solving should be seen in a broad way, reflecting the demands of daily life in all its aspects, and not just concerned with work-related activity. This is underlined by the inclusion of creativity, in both pragmatic and artistic senses, within this domain.

| Subdomains of the Learning Approaches and Cognition Domain for the Postprimary 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 decisionmaking** | Critical decisionmaking 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. |

# Numeracy and Mathematics

**Description:** 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 postprimary 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.

**Policy Rationale:** 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 (Hanushek and Woessmann 2007). 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.

Several global dialogues highlight the importance of numeracy and mathematics. As part of UNESCO's HECDI, a recent review of indicators for measuring progress toward EFA Goal 1 (comprehensive early childhood education) found that "early numerical abilities or knowledge of numbers" are widely regarded as important for school readiness in children age three to five years (Tinajero and Loizillon 2012, 9). Currently, the MICS and EDI are both used globally to measure early numeracy concepts.

EFA Goal 6 lists numeracy as one of the measurable learning outcomes to be achieved by 2015. Additionally, the GPE has engaged in a consultative process to identify indicators for meeting its strategic goals in GPE countries. Basic literacy and numeracy in the early grades have been proposed as indicators for Strategic Goal 2, Learning for All.

Many existing multicountry assessments focus on numeracy for primary-age children (PASEC, SACMEQ, LLECE, ASER, Uwezo, EGMA, TIMSS, PISA). The TIMSS Grade 8 assessment for mathematics covers the content domains of number, algebra, geometry, and data and chance. The PISA framework measures mathematical literacy in the areas of mathematical content, mathematical processes, and application of content and processes to situations. Overall, numeracy and mathematics have achieved wide recognition as a key area of policy focus.

## Numeracy and Mathematics: Early Childhood Level

**Research Rationale:** Early mathematical knowledge has been shown to be a primary predictor of later academic achievement in both reading and mathematics (Duncan et al. 2007; Jordan et al. 2007). Persistent problems in mathematics (Siegler et al. 2012) predict outcomes in secondary school and college atten-

dance. Mathematical abilities can vary tremendously. Preprimary experience, cultures favoring quantitative activities, socioeconomic status, and societal and parental schooling expectations (Ginsburg 1997) can all influence young children's numeracy skills throughout early childhood.

**Consultation Rationale:** The domain numeracy and mathematics was listed under "cognition and general knowledge" in the draft competencies, but the feedback suggested it should be considered as a separate domain to align with primary and postprimary levels. One additional subdomain, "representing and interpreting data," was proposed in the draft competencies but was eventually eliminated because the contributors felt it was too advanced for this age group. Although in many learning environments young children develop the ability to construct and understand simple charts and graphs, the consensus was that at a global level this skill was too high-level to be expected from all children before primary school.

**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.<br><br>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 determining the attribute to measure and the units best suited for measuring. |

## Numeracy and Mathematics: Primary Level

**Research Rationale:** 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 (Orrill 2001). Individuals who are unable to reason mathematically also have difficulty solving problems and reasoning independently. 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 (Kilpatrick et al. 2001).

It is critical that young people understand the mathematics they are learning. The mathematics taught in the primary grades serves as a foundation for the knowledge and skills needed for success in secondary school and beyond (Langrall et al. 2008). Increasingly, using mathematics is essential for success in more and more complex and technological societies. Helping students develop conceptual understanding, mastery and fluency with early mathematics is essential to ensuring that they will have the opportunity to successfully complete more advanced mathematics courses. From analyzing tables and graphs to making good decisions in the marketplace, students must know how to spot flaws in reasoning as well as determine the reasonableness of the results of computations (Ball, Lewis, and Thames 2008; Lampert 1986). In brief, developing numeracy and the capacity to apply numeracy skills to everyday tasks and more advanced problems is essential to success in school.

In many classrooms around the world, mathematics instruction is dominated by procedures that entail teaching students to calculate without focusing on mastering numbers, what they represent, how they work and how they can be used to understand our world. Instead, children should be taught to understand mathematics, develop strategic competence and advanced reasoning for problem solving, and be able to use mathematical knowledge and skills to communicate and justify reasoning to others. Finally, 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 (Sarama and Clements 2009). Finally, 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 (Skovmose and Valero 2008).

**Consultation Rationale:** Consultees agreed that mathematics and numeracy should be part of a global learning outcomes framework. There was disagreement over how the subdomains should be grouped. Three are listed below, but some feedback suggested that there could be five subdomains: numbers and operations, geometry, measurement, algebraic thinking / patterns, and statistics / data analysis.

| 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. |

## Numeracy and Mathematics: Postprimary Level

**Research Rationale:** 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 the disposition to use, in context, a combination of: underpinning 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 (Numeracy Education Strategy Development Conference 1997).

There is good research support for policy objectives associated with numeracy. One study from the U.K. (McIntosh and Vignoles 2000) shows an economic return from numeracy abilities that may be stronger than the return to literacy abilities, even at relatively low levels of capability. Similarly, there are a number of studies showing the effects of numeracy in terms of enhanced comprehension of everyday information. One such study examined health patients' understanding of risk and utility of treatment, and concluded that a person's subjective attitude to quantitative information was a strong predictor of their ability to understand the treatment options (Reyna et al. 2009).

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 (OECD 2009). The research literature supports numeracy and mathematical capability and confidence as highly significant learning outcomes.

Mathematics and numeracy are important for understanding the world around us. Mathematical abilities affect both wages and employability in adulthood and democratic access to "powerful mathematical ideas" (Skovsmose and Valero 2008). Individuals use data analysis and statistical calculations in the context of real-life situations as they are presented with facts and figures. There is a need to interpret and make sense of these types of information and data, for example, by understanding what "average" means in different contexts.

**Consultation Rationale:** There was broad and consistent support for the inclusion of a numeracy domain within the framework for postprimary education. The questions raised were about the relationship between such a domain and a scientific domain. One respondent pointed out that "at postprimary level, the domain of numeracy/maths is represented by a few applications but not as a subject in the way it is set out for primary level; while science is omitted. Yet science and maths are internationally recognized as requirements for secondary education, and are domains." There was also consensus that numeracy and mathematics at the postprimary level should recognize higher-level mathematics skills and not be limited to abilities that are directly related to work or everyday life.

It appears that this domain has attained a relatively unchallenged status as a key area of learning as a broadly understood construct that contributes to individuals' lives in a variety of significant ways.

| Subdomains of the Numeracy and Mathematics Domain for the Postprimary 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. |

# Science and Technology

**Description:** 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.

**Policy Rationale:** The areas of science and technology are increasingly prioritized in global policy dialogues. Article 29 of the CRC lists "the development of respect for the natural environment" as one of the aims of education for all children (United Nations 1989). The Rio +20 outcome document, "The Future We Want," briefly mentions learning outcomes related to sustainable development and information and communication technologies (ICTs) in paragraph 230: "We therefore resolve to improve the capacity of our education systems to prepare people to pursue sustainable development, including through enhanced teacher training, the development of sustainability curricula, the development of training programmes that prepare students for careers in fields related to sustainability, and more effective use of information and communications technologies to enhance learning outcomes."

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. One implication is that the teaching of these areas is critical, as seen in the United States with the president's recent allocation of $100 million to support science, technology, engineering and math (STEM) teachers and create a STEM Master Teacher Corps (White House 2012). This policy reflects a long-term competitive approach to international scores in these areas on the part of the United States, but there is attention paid to performance in this area around the globe.

The PISA framework measures scientific literacy in 65 mostly middle- and high-income countries. This concept includes scientific knowledge or concepts, scientific processes and application of knowledge and processes to situations or contexts. PISA also includes an optional computer familiarity questionnaire, which focuses on the availability and use of ICTs, students' ability to carry out computer tasks, and students' attitudes toward computer use (OECD 2009). TIMSS measures scientific literacy in three areas in primary (Grade 4): life science, physical science and earth science. TIMSS was conducted in 63 countries and 14 states or regions in (IEA 2011).The TIMSS Grade 8 assessment also measures content knowledge in the domains of biology, chemistry, physics, and earth science. It is noteworthy that while secondary-age students are included in these surveys, there have been very few efforts to date to understand distribution of knowledge in this domain among adults.

In early childhood, science and technology is an emerging domain at the global level. None of the reviewed global policies and dialogues cited science and technology as important domains in early childhood, and none of the global assessment initiatives reviewed measure learning in these areas.

## Science and Technology: Early Childhood Level

**Research Rationale:** 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 (Kuhn 2011). 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 (Cohen and Amsel 1998). 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 (Vosniadou 1992). In the biological world, children seem to understand that behaviors of living things are directed to sustain life (Inagaki and Hatano 2004) and have other rudimentary understandings of animal biology (e.g., can differentiate between nonliving and living things like wind-up rabbits and real rabbits). 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 (Metz 1995).

**Consultation Rationale:** While many of the consultees called for alignment across the early childhood, primary and postprimary domains, very few recommended technology standards in early childhood. Even at the primary level, there was disagreement on whether technology competencies should be included, given the lack of available technology in many parts of the world. Additionally, low levels of preprimary enrollment and inadequate teacher training and preparation in many countries led some contributors to question the feasibility of science standards in early childhood. Participants in one consultation in a developing country commented, "Inquiry skills (gathering data) and organizing information are not included, even in the curriculum. The deprived, low-literacy home environments also do not provide any support for developing such skills."

| 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. |

## Science and Technology: Primary Level

**Research Rationale:** 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 (Kuhn 2009). 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 (National Research Council 2012).

Results from the 2007 TIMSS found that even in the highest-performing economies, Singapore and Taiwan, only 36 percent and 19 percent of students, respectively, performed at or above the advanced international benchmark for science. 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 U.S. and other high-income countries. However, while technology development and knowledge currently lag in developing countries, the proliferation of cell phones is a sign that even in households without access to electricity, technology has a foothold.

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. For example, teacher data from the 2007 TIMSS found that teachers at the fourth grade level reported little specific training or specialized education in science. Only 50 percent of students in the international assessment had teachers who reported feeling "very well prepared" to teach science topics.

**Consultation Rationale:** Science was mentioned only briefly in the draft competencies for the primary level, and many consultees stated that science was missing and should be its own domain. For example, one stakeholder suggested, "A 'Science' or 'Science and life' type of domain is needed which covers, inter alia: understanding the physical, chemical and biological basis of life; energy sources; health including adolescent and reproductive health; environmental sustainability; disaster risk reduction." Some felt science should be combined with technology, while others felt it should be its own domain.

There was much discussion about technology in primary school. Some contributors felt it was a lower priority than basic skills such as math and reading. Most felt that the existing capacity to provide technology education in schools was low worldwide, especially in low-income countries. One consultee stated, "In terms of the technology domain—schools need electricity first (37 schools in my district have no electricity)—so they cannot develop an awareness of computer technology as there is no opportunity to do so."

| 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. |

## Science and Technology: Postprimary Level

**Research Rationale:** There is widespread support in the research literature for moving beyond the notion of scientific knowledge as a neutral, objective and true collection of facts that can be learned without any problems. 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. As one philosopher of science argues, when looking at these ideas people need "to substitute 'quality' for 'truth' in the evaluation of scientific materials; the social and ethical aspects of science are then firmly upon the agenda" (Ravetz 1996, x).

This is reflected in the PISA approach, which asks: "As citizens, what knowledge is most appropriate? An answer to this question certainly includes basic concepts of the science disciplines, but that knowledge must be used in contexts that individuals encounter in life. In addition, people often encounter situations that require some understanding of science as a process that produces knowledge and proposes explanations about the natural world" (PISA 2006, 21). Going further, PISA also assesses attitudes toward science, arguing that subjective approaches affect the objective use of this knowledge.

The research supports an active and multidimensional model of scientific and technical knowledge that includes the uses and context of scientific concepts. 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.

When considering scientific and technological knowledge, it is important to recognize that the Western model is not universal. There are many forms of indigenous knowledge that, as shown in a study in Uganda, "[play] a critical and significant role for the people who possess it. Many people use it to a lesser or larger degree to identify and use natural resources in their environment for their well-being" (Tabuti and van Damme 2012, 30). This underlines the need for measurements of scientific understanding to be contextualized, nuanced and reflective of individuals' life experiences.

**Consultation Rationale:** There was strong support for the inclusion of a science and technology domain, with one respondent stating: "There should be another domain to cover science and technologies, including the scientific approach, production of scientific knowledge and specific scientific subject areas (biology, chemistry, etc.)." Another pointed out that "it is important that the terms and framework are developed in a way that is easy for Ministries of Education to respond to. Hence they should relate to widely accepted concepts, e.g., 'science.' If the thinking is that the teaching of science or other subjects is too theoretical and doesn't lead to real-world skills, then the subdomains and illustrative outcomes should help correct this."

| Subdomains of the Science and Technology Domain for the Postprimary 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. |

# Overarching Considerations

This framework was used as a starting point for conversations about how learning outcomes should be measured. However, working group members and other stakeholders raised the following issues about the framework and the diagram:

- The diagram shown in Figure 1 combines outcomes related to contextual factors (e.g., physical well-being), processes (e.g., learning approaches and cognition), and academic content (e.g., science and technology), and some of the domains include several of these aspects (e.g., within social and emotional development, one may learn academic content through the process of teamwork). It was suggested that the LMTF clarify these distinctions when presenting this diagram in future publications.
- Humans learn by making connections across content areas and experiences. This diagram may send the message that learning should occur in discrete domains rather than through an integrated curriculum.
- While the diagram rightly places an equal importance on all seven domains, different purposes might lead users to emphasize some more than others at different levels (i.e., global goals might focus on one or two domains, while national goals might focus on more).
- While the working group proposed subdomains that are important globally, this list is not meant to be exhaustive and could be a useful starting point for country-level determinations of important subdomains.
- Some of the subdomains were considered to be at a level too high for global applicability while others were considered to be set too low.
- Initially, the intensity of color in the diagram in the early childhood years was meant to represent the intense capacity for brain development that occurs during this time in a child's life. However, several stakeholders pointed out that this implies that learning in one stage is more important than another, and the capacity for brain development does not necessarily link directly to learning outcomes. The task force asked the subsequent working group on measures and methods to make recommendations on the level of the competencies based on existing learning assessments.

Furthermore, the LMTF determined that some issues needed further investigation by the subsequent working group on measures and methods:

- **Should global learning goals be measured in an internationally comparable way?** The task force felt that more analysis is needed on how these tests can influence policy and practice. Investing time and resources in internationally comparable tests only to end up at the bottom of a league table is discouraging to education ministries and may not provide the type of information necessary to improve learning levels. However, internationally comparable assessments have successfully drawn attention to gaps in curriculum and instruction and have been used to design school reform efforts in many countries. It is clear that internationally comparable assessments are useful in some contexts and less useful in others. The LMTF is interested in a tiered model of

measuring learning that takes into account internationally comparable assessments in some contexts and alternative assessments in others.

- **Should learning assessment focus on children and youth in schools or all children and youth, regardless of where they are learning?** Given that schools are the primary vehicles for improving learning outcomes, some argue that learning assessments should be conducted only within schools to simplify and focus on making improvements to the system. Others cited low enrollment numbers in preprimary programs (48 percent GER globally) and secondary school (70 percent GER globally) (UNESCO 2012), especially in low- and middle-income countries, as reasons why the recommendations must extend to children outside formal school settings. This is an issue for which the answer may vary by country context—countries with universal or near-universal enrollment may compile accurate assessments of learning through schools, while countries with lower levels of enrollment may need an alternative strategy for learning assessment, such as household surveys.

- **Should learning be measured by age cohort or grade level?** Some argue that an age-based model would keep governments accountable for the learning of all children, whether or not they are enrolled in school. Children would need to be enrolled in schools, progressing through the levels, and learning as they go in order to meet any national or global education goals based on age cohorts (Pritchett and Beatty 2012). Others argue that the varying ages at which children begin school globally would make grade levels a fairer way of measuring learning, especially in any internationally comparable way.

# Conclusion

Building a consensus around global goals and measures for learning is a crucial step in ensuring a worldwide focus on access plus learning. The Learning Metrics Task Force was convened to provide a forum for all interested stakeholders to share their expertise and ideas for what learning is important and how it can be measured to improve education quality. By identifying areas of consensus and discussing areas of disagreement, the LMTF aims to propose a framework for measuring learning that is acceptable to all stakeholders, even if it is not "ideal" for everyone.

Through task force member organizations, technical working groups, and the public consultation process, an estimated 600 individuals contributed to this first report. By fostering mutual ownership of the ideas and products of the LMTF, the initiative aims to ensure that the recommendations are taken up by task force and working group member organizations. As of January 2013, several groups—including the Global Campaign for Education, Right to Education Project, Commonwealth Education Ministers, Global Partnership for Education, and Save the Children—have been in contact with the LMTF Secretariat to discuss the alignment of strategies and policy recommendations.

The second working group on measures and methods is currently under way and will be presenting its recommendations to the task force at the second in-person meeting in Dubai, United Arab Emirates, February 20–21, 2013. The Measures and Methods Working Group began by mapping existing efforts to measure learning onto the global framework of learning domains and will propose an approach that takes into account current assessment efforts and knowledge gaps for which better tools must be developed. The "Prototype Framework for Measuring Learning Outcomes" document was released in December 2013 for public consultation.

As the LMTF works toward operationalizing learning in the seven domains, the subdomains will be refined, taking into account the actual availability of evidence coming from existing measurement endeavors with different attributes (in most cases, based on years of research and validation). The working groups will continue to refer back to the original standards framework and develop a rationale for why a particular area of learning is or is not included at subsequent stages in the process.

During the third stage of the initiative, the Implementation Working Group will develop recommendations for how learning assessment can be implemented to improve policy and ultimately learning outcomes. The Implementation Working Group will convene in March 2013 to propose an implementation strategy to present to the task force in July 2013. A final report with recommendations is currently scheduled for release in September 2013. Updates will continue to be available online at www.brookings.edu/learningmetrics.

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# Annex A: Individuals Contributing to the Phase I Public Consultation Period

The following list includes all individuals who contributed to the Phase I consultation process and provided their name and affiliation to the LMTF Secretariat. Following the list, photographs are also provided from those who submitted them. Other individuals who participated in in-person consultations but did not provide their name and affiliation were also counted toward the total estimate of 500 participants.

This list does not include members of the task force, Secretariat and working groups who also provided feedback during the consultation period. A full list of task force, Secretariat, and working group members is provided in the front matter of this report.

| Name | Organization | Location |
|---|---|---|
| Melissa Chipili | USAID-Kabul | Afghanistan |
| Fiona J. Morgan | SIL International: Bangladesh | Bangladesh |
| Cecilia Crespo | Education Development Center | Bolivia |
| Seraphine Tambambang | Plan | Cameroon |
| Mary Drinkwater | University of Toronto | Canada |
| Yona Nestel | Plan | Canada |
| Odette Langlais | CIDA | Canada |
| Adnane Daoudi | CIDA | Canada |
| Catherine Vanner | CIDA | Canada |
| Dan Thakur | CIDA | Canada |
| Denise Conway | CIDA | Canada |
| Ferdand Niyokindi | CIDA | Canada |
| Marguerite St. Jacques | CIDA | Canada |
| Patricia Miaro | CIDA | Canada |
| Robin Ruggles | CIDA | Canada |
| Ryan Legault-McGill | CIDA | Canada |
| Catherine DeLaura | The DREAM Project | Dominican Republic |
| Molly Hamm | The DREAM Project | Dominican Republic |
| Ani Yanachkova | The DREAM Project | Dominican Republic |
| Julie de Smet | The DREAM Project | Dominican Republic |
| Leah Elam | The DREAM Project | Dominican Republic |
| Phoebe Sunflower-Wirth | The DREAM Project | Dominican Republic |
| Saad Husni Mustafa Safa | GILO Project, RTI | Egypt |
| Mohammad Abd-el-Fattah Azab | GILO Project, RTI | Egypt |
| Nassim El Sayed Kathir | GILO Project | Egypt |
| Islam Mohammad Mohammad Sheir | GILO Project | Egypt |

| Name | Organization | Location |
|---|---|---|
| Najib Hafez El Diyam | GILO Project | Egypt |
| Rawya Abd-el-Samag Ibani | GILO Project | Egypt |
| Ramadan Abd-el-Hadi El Bayyouni | GILO Project | Egypt |
| Mohammad Ibrahim Abou-el-Naja Ibrahim | GILO Project | Egypt |
| Hosam-Eddin Mohammad Mohammad El Labban | GILO Project | Egypt |
| Ahmad Hasan Abou Ammash | GILO Project | Egypt |
| El Sayed El Said El Said Hawwas | GILO Project | Egypt |
| Mohammad Mahmoud Chahban Abd-el-Wahab | GILO Project | Egypt |
| Fadal Mouhib Fadal-el-Ista | GILO Project | Egypt |
| Sami Selim Ibrahim Zafilim | GILO Project | Egypt |
| Awd Abdallah Hasan Othman | GILO Project | Egypt |
| Mohammad Abou El Foutouh Mohammad Hammoud | GILO Project | Egypt |
| Oussama Abd-el-Fattah Masaad Rizk | GILO Project | Egypt |
| Ramez Ramez Abdallah Abdallah | GILO Project | Egypt |
| Mustafa Hamid Ibrahim Moussa | GILO Project | Egypt |
| Azza Sadek El Sayyed Rizk | GILO Project | Egypt |
| Jamal Omar Mustafa Basha | GILO Project | Egypt |
| Chadia Mohammad Mohammad Balah | GILO Project | Egypt |
| Nashat Ibrahim | GILO Project | Egypt |
| Najla Abd-el-Dayem Samaha | GILO Project | Egypt |
| Rabih Mohammad Mohammad El Jundi | GILO Project | Egypt |
| Mohammad Mahmoud Hussain El Ayyash | GILO Project | Egypt |
| Rashid Ali Abdallah Hussein | GILO Project | Egypt |
| Wael Mohammad Kamal El Hilfawi | GILO Project | Egypt |
| Awd Toufic Awd El Shami | GILO Project | Egypt |
| Amin Mohammad Mohammad El Khayat | GILO Project | Egypt |
| Marianne Kujala-Garcia | Embassy of Finland | Ethiopia |
| Alexander Leicht | UNESCO HQ | France |
| Yoko Mochizuki | UNESCO HQ | France |
| Mari Yasunaga | UNESCO HQ | France |
| Alexandra Draxler | Independent Consultant | France |
| N. Goldstein | DFID | Ghana |
| David Bruce | Plan | Ghana |
| Julien Yombouno | Plan | Guinea |
| Roberto Bussi | Plan | Honduras |
| Mabel Martinez | Plan | Honduras |

| Name | Organization | Location |
|---|---|---|
| Renu Singh | Young Lives | India |
| Sridhar Rajagopalan | Educational Initiatives Pvt Ltd. | India |
| Vishnuteerth Agnihotri | Educational Initiatives Pvt Ltd. | India |
| Vyjayanthi Sankar | Educational Initiatives Pvt Ltd. | India |
| Rahul Venuraj | Educational Initiatives Pvt Ltd. | India |
| Asmi Arul | Educational Initiatives Pvt Ltd. | India |
| Bindu Balan | Educational Initiatives Pvt Ltd. | India |
| Nishchal Shukla | Educational Initiatives Pvt Ltd. | India |
| Meghna Kumar | Educational Initiatives Pvt Ltd. | India |
| Dipti Lal | Educational Initiatives Pvt Ltd. | India |
| Nilima Sarma Mahanta | District Institute of Education and Training (DIET) | India |
| Saradi Bhattachariya | DIET, Kamrup (Mirza) | India |
| Sebika Bora | DIET, Morigaon | India |
| Lipika Medhi | DIET, Morigaon | India |
| Sushmita Sutradhar Das | SCERT, Assam | India |
| Binita Baishya | DIET, Kamrup (Mirza) | India |
| Buddha Baruah | SCERT, Assam | India |
| A. K. Choudhury | DIET, Morigaon | India |
| Geeta Dutta Borthakur | SCERT, Assam | India |
| Samhita Malini Baruah | DIET, Morigaon | India |
| B. Bhuyan | NIPCCD | India |
| Smriti Rekha Sharma | DIET Kamrup | India |
| Pankaja Baruah | DIET Darrang | India |
| Mridula Boruah | SCERT, Assam | India |
| Nirmali Hazarika | SCERT, Assam | India |
| Nilesh Shinde | NIPCCD | India |
| D. K. Saikia | NIPCCD | India |
| Kashmiri Boruah | NIPCCD | India |
| Minakshi Regon | NIPCCD | India |
| Anjela Taneja | Oxfam India | India |
| Aanchal Chomal | Azim Premij Foundation | India |
| Joseph Ochieng | Access Education International | Kenya |
| Mercury Teresa | Access Education International | Kenya |
| Thomas Odhiambo | Access Education International | Kenya |
| Nashon Otieno | Access Education International/KEPSHA | Kenya |
| Lilian Omondi | Access Education International | Kenya |
| Joseph Karuga | Kenya Primary Headteachers' Association (KEPSHA) | Kenya |
| Haji Ibrahim Boya | Kenya Primary Headteachers' Association (KEPSHA) | Kenya |
| Gideon Wasike | Kenya Primary Headteachers' Association (KEPSHA) | Kenya |
| Regina Mulwa | Kenya Primary Headteachers' Association (KEPSHA) | Kenya |
| Margaret Wanjau | Kenya Primary Headteachers' Association (KEPSHA) | Kenya |

| Name | Organization | Location |
|---|---|---|
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| James Mwaura | Kenya Primary Headteachers' Association (KEPSHA) | Kenya |
| Margaret Nguli | Milimani Primary School | Kenya |
| Esther Maina | Milimani Primary School | Kenya |
| Andrew Simiyu | Milimani Primary School | Kenya |
| Rachel Matei | Milimani Primary School | Kenya |
| Anne Cheruiyot | Milimani Primary School | Kenya |
| Jane Waweru | Milimani Primary School | Kenya |
| Phyllis Mocho | Milimani Primary School | Kenya |
| Robert Wandera | Milimani Primary School | Kenya |
| Maranda Anne | Milimani Primary School | Kenya |
| Damar Oyugi | Milimani Primary School | Kenya |
| Jane Oluoch | Milimani Primary School | Kenya |
| Peris Apiyo | Milimani Primary School | Kenya |
| Margaret Achieng | Milimani Primary School | Kenya |
| Ong'ang'a Charles | Milimani Primary School | Kenya |
| Dorice Musamali | Milimani Primary School | Kenya |
| Rhoda Anyango | Milimani Primary School | Kenya |
| Monicah Mwangi | Milimani Primary School | Kenya |
| Loise Gitahi | Milimani Primary School | Kenya |
| Barbara Trudell | SIL International: Africa Area | Kenya |
| Joyce Kinyanjui | Women Educational Researchers of Kenya (WERK) | Kenya |
| Rachel Christina | Education Development Center | Lebanon |
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| Massaman Sinaba | Œuvre Malienne d'Aide à l'Enfance du Sahel (OMAES) | Mali |
| Théodore Nseka Vita | Millenium Consulting Group | Mali |
| Abdoulaye Boniface Dembélé | Œuvre Malienne d'Aide à l'Enfance du Sahel (OMAES) | Mali |
| Bréhima Traoré | Œuvre Malienne d'Aide à l'Enfance du Sahel (OMAES) | Mali |
| Kadiatou Kanté | Œuvre Malienne d'Aide à l'Enfance du Sahel (OMAES) | Mali |
| Marie Eugénie Togola | Œuvre Malienne d'Aide à l'Enfance du Sahel (OMAES) | Mali |
| Youssouf Haïdara | Œuvre Malienne d'Aide à l'Enfance du Sahel (OMAES) | Mali |
| Violeta Malespin | Plan | Nicaragua |
| Ali Amadou | Plan | Niger |
| Benadeth N. Ezekoye | Curriculum Development and Instructional Materials Centre (CUDIMAC), University of Nigeria, Nsukka | Nigeria |
| Olawale O. Olaitan | Department of Vocational Teacher Education (Mechanical/Metal Work Technology), University of Nigeria, Nsukka | Nigeria |
| Azukaego Linda Ezeabasili | Department of Vocational Teacher Education (Mechanical/Metal Work Technology), University of Nigeria, Nsukka | Nigeria |
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| Name | Organization | Location |
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| Chiamka Chukwuone | Department of Vocational Teacher Education (Home Economics), University of Nigeria, Nsukka | Nigeria |
| Nkadi Onyegegbu | Institute of Education, University of Nigeria, Nsukka | Nigeria |
| Onuigbo Liziana | Department of Education Foundations, University of Nigeria, Nsukka | Nigeria |
| Eze Uche | Institute of Education, University of Nigeria, Nsukka | Nigeria |
| Obioma Nwaorgu | Nnamdi Azikiwe University Awka | Nigeria |
| Saima Fayyaz | Bunyad Literacy Community Council | Pakistan |
| Shaheen Attiq | Bunyad Literacy Community Council | Pakistan |
| Zaheer-ud-Din Bebr | Bunyad Foundation | Pakistan |
| M. Asif Mahmood Bhatti | Bunyad Literacy Community Council | Pakistan |
| Shahzad Hussain | Bunyad Literacy Community Council | Pakistan |
| Tasneem Aftab | Oar Aftab Memorial Trust | Pakistan |
| Shamsa Murtaza | PGGA | Pakistan |
| Nasreen Khanum | Bunyad Literacy Community Council | Pakistan |
| Riaz Ahmed | Bunyad Literacy Community Council | Pakistan |
| Muhammad Hanife | Govt. High School Karbath | Pakistan |
| Muhammad Idrees | Govt. High School Heir | Pakistan |
| Saad Isfandiyar Ali | Bunyad Literacy Community Council | Pakistan |
| Muhammad Sajjad | Govt. of Punjaab | Pakistan |
| Shaheen Attiq-ur-Rahman | Bunyad Foundation | Pakistan |
| Maryam Farooq | Bunyad Literacy Community Council | Pakistan |
| Saima Fayyaz | Bunyad Literacy Community Council | Pakistan |
| Bisma Akbar | Oxfam | Pakistan |
| Lucinda Ramos | UNICEF | Pakistan |
| Asyia Kazmi | DFID | Pakistan |
| Khalida Ahmed | UNICEF | Pakistan |
| Arif Amin | AusAID | Pakistan |
| Erum Burki | Save the Children | Pakistan |
| S. Zulfikar Shahq | NEAS | Pakistan |
| Samina Ghafur | Save the Children | Pakistan |
| M. Saleem | CADD | Pakistan |
| T. M. Qureshi | Ministry of Education | Pakistan |
| Riaz H. Malik | Ministry of Education | Pakistan |
| Ali Nur Nabi | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |

| Name | Organization | Location |
|---|---|---|
| Ayesha Bilal | Right to Education Campaign | Pakistan |
| Waqas Bajwa | Annual Status of Education Report (ASER) | Pakistan |
| Parvez Ahmed Seehar | Reform Support Unit | Pakistan |
| Abdul Majeed Bhust | Bureau of Curriculum and Extension | Pakistan |
| Rafiuddin Dakhan | RSU | Pakistan |
| Idrees Jatoi | Bureau of Curriculum and Extension | Pakistan |
| Qamar shahid Siddiqui | PITE Sindh Nawabshah | Pakistan |
| Haroon Laghari | GCECE Hussainabad | Pakistan |
| Baela Raza Jamil | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Professor Dr. Bernadette | St. Joseph's College for Women | Pakistan |
| Amima Sayeed | Teachers Resource Centre (TRC) and Chair Pakistan Coalition for Education (PCE) | Pakistan |
| Atiya Zehra Hussain | Self-employed + Notre Dame Institute of Education (NDIE) | Pakistan |
| Rozina Jumani | Notre Dame Institute of Education (NDIE) | Pakistan |
| Sadia Adeeb | Pre Step | Pakistan |
| Sadia Shakeel | Forum for Human Rights | Pakistan |
| Thomas Christie | Aga Khan University | Pakistan |
| Raana Jilani | Aga Khan University | Pakistan |
| Isbah Mustafa | Aga Khan University | Pakistan |
| Hina Kazmi | Pre Step Advisor | Pakistan |
| Afshan Razzaq | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Ansar | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Shaukat Ali | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| M. Bashir Gondal | Punjab Examination Commission (PEC) | Pakistan |
| Abdullah Faisal | Punjab Education Assessment Systems (PEAS) | Pakistan |
| Nasir Mahmood | Punjab Education Assessment Systems (PEAS) | Pakistan |
| M. Azeem | Punjab Education Assessment Systems (PEAS) | Pakistan |
| Saman Jamil | Punjab Text Book Board (PTB) | Pakistan |
| Rukhsana Zafar | Punjab Text Book Board (PTB) | Pakistan |
| Shahzad Mahmood Ali | Punjab Text Book Board (PTB) | Pakistan |
| Zulfiqar Saqib | Directorate of Staff Development (DSD) | Pakistan |
| Yasmeen Wyne | Directorate of Staff Development (DSD) | Pakistan |
| Jamil Najam | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Hafiz M. Iqbal | Institute of Education and Research-Punjab University (IER-PU) | Pakistan |
| Mansoor Malik | Dawn News—Media | Pakistan |
| Uzma Quraishi | Lahore College for women University (LCWU) | Pakistan |
| Sajeela Ali | Lahore College for women University (LCWU) | Pakistan |
| Rafia Razaq | Institute for Professional Learning (IPL) | Pakistan |
| Rabia Farooq | Institute for Professional Learning (IPL) | Pakistan |
| Inayyat-Ullah | PACADE | Pakistan |

| Name | Organization | Location |
|---|---|---|
| Fakh-ur-Nisa | Richard Chandler Singapore | Pakistan |
| Sobia Tahir | SAHE—CSO | Pakistan |
| Khadija Nawaz | SAHE—CSO | Pakistan |
| Asma Bajwa | Annual Status Education Report (ASER) | Pakistan |
| Osman Shahbaz | Annual Status Education Report (ASER) | Pakistan |
| Rubina Tariq | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Huma Sikandar | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Wardha Mirza | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Tahira Maqbool | Idara-e-Taleem-o-Aagahi (ITA) | Pakistan |
| Khadim Hussain | GRACE Association | Pakistan |
| Santiago Cueto | Young Lives | Peru |
| Cesar Saldarriaga | Plan | Peru |
| Xinia Skoropinski | SIL International: Philippines | Philippines |
| Karla Smith | SIL International: Asia Area | Philippines |
| Jim Smith | SIL International: Asia Area | Philippines |
| Matthew Wisbey | SIL International: Asia Area | Philippines |
| Catherine Young | SIL International: Asia Area | Philippines |
| Margaret Sinclair | Education Above All | Qatar |
| John Gregg | Education Above All | Qatar |
| Anastasia Maksimova | Center for International Cooperation in Education Development | Russian Federation |
| Galina Kovaleva | Russian Academy of Education | Russian Federation |
| Jane Czornowol | Musanze District/ VSO volunteer | Rwanda |
| Hywel Davies | Bugesera District/ VSO volunteer | Rwanda |
| Ruth Mbabazi Kabutembe | VSO Rwanda | Rwanda |
| Sarah Challoner | VSO Rwanda | Rwanda |
| Charlotte Phillips | VSO Rwanda | Rwanda |
| Linda Wilson | Gisagara District/ VSO volunteer | Rwanda |
| Martin Foday | Plan | Sierra Leone |
| Juan E Jiménez | Universidad La Laguna | Spain |
| Hien Ekeroth | Jensen Education | Sweden |
| John Estrada | VSO Tanzania | Tanzania |
| Khamis Said Mohammed | Miti Ulaya Teachers Resource Center and MOEVT - Training and Planning Office | Tanzania |
| Fatma Mgeni Haji | Miti Ulaya Teachers Resource Center and MOEVT - Training and Planning Office | Tanzania |
| Mkubwa A. Omar | Miti Ulaya Teachers Resource Center and MOEVT - Training and Planning Office | Tanzania |
| Susan Michell | VSO Tanzania | Tanzania |
| Frank Deogratias | Kanazi Primary School | Tanzania |
| Dickson Mwemezi | Katoma B Primary School | Tanzania |
| Alexander Adrian | Bukoba Rural District Council | Tanzania |

| Name | Organization | Location |
|---|---|---|
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| Ramya Vivekanandan | UNESCO Bangkok | Thailand |
| Margarete Sachs-Israel | UNESCO Bangkok | Thailand |
| Huong Le Thu | UNESCO Bangkok | Thailand |
| Marlene Cruz | UNESCO Bangkok | Thailand |
| Stella Yu | UNESCO Bangkok | Thailand |
| Abdul Hakeem | UNESCO Bangkok | Thailand |
| Min Bista | UNESCO Bangkok | Thailand |
| Ashima Kapur | UNESCO Bangkok | Thailand |
| Aurélie Acoca | UNESCO Bangkok | Thailand |
| Danny Padilla | UNESCO Bangkok | Thailand |
| Lay Cheng Tan | UNESCO Bangkok | Thailand |
| Takaaki Kizu | UNESCO Bangkok | Thailand |
| Diana Kartika | UNESCO Bangkok | Thailand |
| William Federer | UNESCO Bangkok | Thailand |
| Elizabeth Foerster | SIL International: Thailand | Thailand |
| Jo Boyden | Young Lives | UK |
| Caine Rolleston | Young Lives | UK |
| Ruth Naylor | CfBT | UK |
| Jacqui Mattingly | CfBT | UK |
| Amir Jones | CfBT | UK |
| Anita Reilly | Plan International | UK |
| Polly Kirby | VSO | UK |
| Abraha Asfaw | Center for Universal Education at The Brookings Institution | USA |
| Urvashi Sahni | Center for Universal Education at The Brookings Institution | USA |
| Helen Abdazi | Global Partnership for Education | USA |
| Roger Weissberg | CASEL, University of Illinois at Chicago | USA |
| Lant Pritchett | Harvard University | USA |
| Luis Crouch | Global Partnership for Education | USA |
| Emily Vargas-Baron | RISE Institute | USA |
| Frank Method | Independent Consultant | USA |
| Lesley Bartlett | Teachers College, Columbia University | USA |
| Carolyn Temple Adger | Center for Applied Linguistics | USA |
| Sweta Shah | Plan International | USA |
| Nancy Clark-Chiarelli | Education Development Center | USA |
| Carrie Lewis | Education Development Center | USA |
| Sherri Rudick | Education Development Center | USA |
| Diana Weber | SIL International: Americas Area | USA |
| Kristine Trammell | SIL International: Africa and Americas Areas | USA |

| Name | Organization | Location |
|---|---|---|
| Steven J. Klees | University of Maryland | USA |
| Jennifer Daniel | World Vision International | USA |
| Barbara Koech | World Vision International | USA |
| Sabrena Davis | EdisonLearning | USA |
| Nicole Wood | EdisonLearning | USA |
| Michael McEachran | EdisonLearning | USA |
| Heath Branham | EdisonLearning | USA |
| Tim Ulmer | EdisonLearning | USA |
| April Hattori | EdisonLearning | USA |
| Jodie Beckley | EdisonLearning | USA |
| Tressa Johnson | Elma Philanthropies | USA |
| Marguerite Clarke | World Bank | USA |
| Anita Anastacio | IRC | USA |
| Colette Chabbot | George Washington University | USA |
| Sweta Shah | Plan International | USA |
| Jean-Marc Bernard | Global Partnership for Education | USA |
| Jennifer Anderson | Save the Children | USA |
| Noha Hussein | Save the Children | USA |
| Jill McFarren Aviles | Save the Children | USA |
| Sarah Press | Save the Children | USA |
| Seung Lee | Save the Children | USA |
| Dan Abbott | Save the Children | USA |
| Caroline Alesbury | Save the Children | USA |
| Shirin Lutfeali | Save the Children | USA |
| Cecile Ochoa | Save the Children | USA |
| Eric Eversmann | Save the Children | USA |
| Ritu Sharma | Women Thrive Worldwide | USA |
| Gibson Nchimunya | UNICEF | Zambia |
| Shadreck Nkoya | ECZ | Zambia |
| Heather M. Mwansa | MESVTEE | Zambia |
| Teza N. Musakanya | ECZ | Zambia |
| Agness M. Shipanuka | Exams MESVTEE | Zambia |
| Maria G. Mulenga | ECZ | Zambia |
| Mei Mei Peng | USAID | Zambia |
| Cornelius Chipoma | USAID | Zambia |
| Vincent Chiyongo | MESVTEE | Zambia |
| Jolly Chembe | ECZ | Zambia |
| Mirriam Chonya | MESVTEE | Zambia |
| Henry Msango | UNZA | Zambia |
| Florence Mweembe | MESVTEE (Science) | Zambia |

| Name | Organization | Location |
|---|---|---|
| Shakazo Mzyece | ECZ | Zambia |
| Stanley M. Siasinyanga | ECZ | Zambia |
| Madrine B. Mbita | MESVTEE | Zambia |
| Samantha Chuula | Room to Read | Zambia |
| Kayombo Chinyama | i-School | Zambia |
| Dorothy Kasanda | Camfed | Zambia |
| Edith Ng'oma | ChildFund Zambia | Zambia |

Consultation Participants in Nsukka, Nigeria, Hosted by University of Nigeria, Nsukka


Consultation Participants in Gary, Indiana, USA, Hosted by EdisonLearning

Consultation in Guwahati, Assam, India, Hosted by Government of Assam

Consultation Participants in Puerto Plata, Dominican Republic, Hosted by the DREAM Project

Consultation in Islamabad, Pakistan, Hosted by Idara-e-Taleem-o-Aagahi

Consultation in Lahore, Pakistan, Hosted by Bunyad Foundation

Consultation in Damietta, Egypt, Hosted by Technology Development Center and GILO Project

# Annex B: Selected Global Dialogues and Frameworks on Learning Outcomes

## Education for All

Goals 1 and 6 of EFA provide guidance on what types of learning are important at different age levels. EFA Goal 1 is aimed at "expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children." The Dakar Framework for Action (2000) further states that such programs should focus on all of a child's needs including health, nutrition and hygiene, cognitive, and social development.

EFA Goal 6 is "Improving every aspect of the quality of education, and ensuring their excellence so that recognized and measureable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills." While literacy and numeracy are relatively straightforward, "essential life skills" covers a range of content areas and learning domains.

- According to the UIS Glossary, life skills are "expression[s] used in one of the following ways, sometimes combining some of the categories: 1—often used to capture skills such as problem-solving, working in teams, networking, communicating, negotiating, etc. Their generic nature—their importance throughout life, in varying contexts—is held in common with literacy skills. . . . These generic skills are seldom, if ever, acquired in isolation from other skills; 2—. . . also used to refer to skills needed in daily life that are strongly connected to a certain context. Examples are livelihood skills, health skills, skills related to gender and family life, and environmental skills. These can be termed 'contextual skills', while accepting that skills are in practice never purely contextual or purely generic; . . . 3—also used in the school context . . . to refer to any subject matter other than language or mathematics; . . . 4—there are other miscellaneous skills being referred to as life skills, such as cooking, making friends and crossing the street."
- According to UNICEF, "'Life skills' are defined as psychosocial abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demands and challenges of everyday life. They are loosely grouped into three broad categories of skills: cognitive skills for analyzing and using information, personal skills for developing personal agency and managing oneself, and inter-personal skills for communicating and interacting effectively with others."
- The OECD adopted a definition of life skills in the context of the DeSeCo project. These competencies are (1) functioning in socially heterogeneous groups, (2) acting autonomously and (3) using tools interactively.

## UN Convention on the Rights of the Child (CRC)

The CRC (1989) makes numerous references to education and goals for children's education. The articles most pertinent to learning outcomes include:

**Article 29.1:** States Parties agree that the education of the child shall be directed to:

(a) The development of the child's personality, talents and mental and physical abilities to their fullest potential;

(b) The development of respect for human rights and fundamental freedoms, and for the principles enshrined in the Charter of the United Nations;

(c) The development of respect for the child's parents, his or her own cultural identity, language and values, for the national values of the country in which the child is living, the country from which he or she may originate, and for civilizations different from his or her own;

(d) The preparation of the child for responsible life in a free society, in the spirit of understanding, peace, tolerance, equality of sexes, and friendship among all peoples, ethnic, national and religious groups and persons of indigenous origin;

(e) The development of respect for the natural environment.

**Article 28.3:** "States Parties shall promote and encourage international cooperation in matters relating to education, in particular with a view to contributing to the elimination of ignorance and illiteracy throughout the world and facilitating access to scientific and technical knowledge and modern teaching methods. In this regard, particular account shall be taken of the needs of developing countries."

**Article 24.1.e** affirms that states should take measures "To ensure that all segments of society, in particular parents and children, are informed, have access to education and are supported in the use of basic knowledge of child health and nutrition, the advantages of breastfeeding, hygiene and environmental sanitation and the prevention of accidents."

## The DeLors Report

The DeLors Report was published by UNESCO and the International Commission on 21st Century Education (1996) to provide global guidance on principles to guide lifelong learning. While the report is now 16 years old, it offers a framework for identifying globally-relevant learning competencies. Four "types of knowledge" were identified along with examples of behaviors or skills that fall under each category:

- **learning to know:** developing one's concentration, memory skills and ability to think
- **learning to do:** communication, team and problem-solving skills, ability to take initiative
- **learning to live together:** empathy, curiosity, and strong interpersonal skills
- **learning to be:** developing imagination and creative expression, ability to know oneself and know others

## Rio +20: The Future We Want

The Rio +20 outcome document, "The Future We Want," briefly mentions learning outcomes related to sustainable development and ICTs in paragraph 230: "We therefore resolve to improve the capacity of our education systems to prepare people to pursue sustainable development, including through enhanced teacher training, the development of sustainability curricula, the development of training programmes that prepare students for careers in fields related to

sustainability, and more effective use of information and communications technologies to enhance learning outcomes" (United Nations Conference on Sustainable Development 2012).

## GPE Indicators

The GPE has engaged in a consultative process to identify indicators for meeting its strategic goals in GPE countries. Basic literacy and numeracy in the early grades have been proposed as indicators for Strategic Goal 2, Learning for All.

## Global Education First Initiative

The initiative identifies improving the quality of learning as a central priority and has a rage of targets related to that end, including around improved assessment of learning outcomes, literacy and numeracy skills, livelihood and life skills, etc. Global citizenship is particularly emphasized in this initiative, the principles of which are described as:

> Education must be transformative and bring shared values to life. It must cultivate an active care for the world and for those with whom we share it. Education must also be relevant in answering the big questions of the day. Technological solutions, political regulation or financial instruments alone cannot achieve sustainable development. It requires transforming the way people think and act. Education must fully assume its central role in helping people to forge more just, peaceful, tolerant and inclusive societies. It must give people the understanding, skills and values they need to cooperate in resolving the interconnected challenges of the 21st century (Office of the UN Secretary-General 2012).

# Annex C: International, Regional and Cross-National Initiatives to Measure Learning

| Instrument/ Initiative | Ages/ Grades | Subjects | Frequency | Location | Countries[5] | Administered by | Data availability |
|---|---|---|---|---|---|---|---|
| **Multiple Indicator Cluster Survey (MICS)** | Age 0–5 | Early childhood development (literacy, numeracy, physical, social-emotional and approaches learning domains) | 1995, 2000, 2005, 2009-11 | Household | 55 countries, 50 developing | Government organizations, with technical assistance from UNICEF | Full dataset available for download online |
| **Young Lives** | Ages 4–17 | Language, literacy, numeracy, social/emotional | 2002, 2006, 2010, | Household | 4 developing countries (Ethiopia, India, Peru, Vietnam) | Universities, independent research institutes, government research institutes, overseen by University of Oxford | Full dataset available for download online |
| **Early Development Instrument (EDI)** | Age 4–6 (School entry) | Physical, social, emotional, language, cognitive, communication | Since 1998, varies by country | School | 24 countries, 14 developing | Varies by country | Data from developing countries are held by governments, World Bank and Aga Khan University; some reports available upon request |
| **Early Grade Reading Assessment (EGRA)** | Grades 1–4 | Basic literacy | Since 2008, varies by country | School | 44 developing countries | Varies by country (primarily RTI International) | Reports available online |
| **Early Grade Math Assessment (EGMA)** | Grades 1–4 | Basic math | Since 2011, varies by country | School | 11 developing countries | RTI International | Reports available online |
| **Literacy Boost** | Grade 1-4 | Basic literacy | Since 2009, Varies by project | School | 9 developing countries | Save the Children | Reports available upon request |
| **Annual Status of Education Report (ASER)** | Age 6-16 | Reading, Math | Annually since 2005 in India, 2008 in Pakistan | Household | 2 developing countries (India and Pakistan) | Civil society organizations | Public reports online disaggregated by district |

| Instrument/ Initiative | Ages/ Grades | Subjects | Frequency | Location | Countries[5] | Administered by | Data availability |
|---|---|---|---|---|---|---|---|
| **Uwezo** | Age 5-16 | Reading, Math | Annually since 2010 | Household | 3 developing countries (Kenya, Tanzania, Uganda) | Civil society organizations | Public reports online disaggregated by district |
| **Latin American Laboratory for Assessment (LLECE)** | First study: Grade 3 and 4; Second study: Grade 3 and 6 | Math, Reading, Science (second study only) | 1997, 2006 | School | First study: 13 developing countries in Latin America; Second study: 16 developing countries in Latin America | National governments | Data available for download online |
| **Progress in International Reading Literacy Study (PIRLS)** | Grade 4 | Reading comprehension | 2001, 2006, 2011 | School | 49 countries, 13 developing | National research partners | Data available for download online |
| **Pre-PIRLS** | Grades 4-6 | Basic reading comprehension | 2011 | School | 3 developing countries | National research partners | Data available for download online |
| **Trends in International Mathematics and Science Study (TIMSS)** | Grades 4 and 8 | Math, Science | 1995, 1999, 2003, 2007, 2011 | School | 63 countries, 28 developing | National research partners | Data available for download online |
| **Analysis Programme of the CONFEMEN Education Systems (PASEC)** | Grades 2 and 5 | Math, Reading (French) | 1993-2010 (1-3 countries assessed each year) | School | 13 developing countries - Francophone Africa | National governments | Reports available for download online |
| **Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ)** | Grade 6 | Math, Reading (English) | 1995, 2000, 2007 | School | 14 developing countries—Anglophone Africa | National governments | Reports available for download online |

| Instrument/ Initiative | Ages/ Grades | Subjects | Frequency | Location | Countries[5] | Administered by | Data availability |
|---|---|---|---|---|---|---|---|
| **Programme for International Student Assessment (PISA)** | Age 15 | Literacy, Math, Science | 2000, 2003, 2006, 2009 | School | 65 countries, 32 developing | International contractors, national governments | Reports available for download online |
| **Literacy Assessment and Monitoring Programme (LAMP)** | Age 15+ | Reading, Numeracy | Varies by country | Household | 12 developing countries | National governments | Varies by country |
| **Programme for the International Assessment of Adult Competencies (PIAAC)** | Age 16-65 | Reading, Numeracy, and Scientific Literacy | Varies by country | Household | 23 OECD countries | International contractors, national governments | Varies by country |

# Annex D: Methodology

The recommendations of the LMTF were developed through an iterative process opened to any interested stakeholders. The LMTF process has three major components: the high-level task force, three technical working groups, and three public consultation periods. The process is facilitated by the UNESCO Institute for Statistics (UIS) and the Center for Universal Education (CUE) at Brookings as the LMTF co-Secretariat.

## Establishment of the Learning Metrics Task Force

The Learning Metrics Task Force was established between July and September 2012. Participating organizations were identified through a stakeholder analysis conducted in early 2012. The Secretariat made every effort to recruit a task force with balanced representation from developing/developed countries and all education stakeholders, including teachers organizations, civil society, multilateral organizations, regional organizations, donors, and the private sector. As of September 28, 2012, the following organizations and agencies had accepted the invitation to participate in the LMTF:

- ActionAid
- African Union
- Arab League of Educational, Cultural, and Scientific Organization (ALECSO)
- Association for Education Development in Africa (ADEA)
- Campaign for Female Education in Zambia (Camfed)
- City of Buenos Aires, Argentina
- Dubai Cares / United Arab Emirates
- Education International
- Agence Française de Développement (AFD)
- Global Partnership for Education Government of Assam, India
- International Education Funders Group (IEFG)
- Jordan Ministry of Education
- Kenyan Ministry of Education
- Korean Educational Development Institute (KEDI)
- Office of the UN Secretary General
- Organización de Estados Iberoamericanos (OEI)
- Pearson International
- Pratham
- South Asian Association for Regional Cooperation (SAARC)
- Southeast Asian Ministers of Education Organization (SEAMEO)
- UK Department for International Development (DFID)
- UNDP
- UNESCO
- UNICEF
- United States Agency for International Development (USAID)
- World Bank

The first virtual meeting of the task force was held on July 17, 2012. Seventeen task force members and seven members of the Secretariat participated in the first meeting. The Secretariat conducted optional pre-meeting briefings with all task force members who requested them.

The key topics and conclusions from this meeting were:

1. Structure: The group agreed that two small, informal subgroups will be formed.
    a. Post-2015 engagement. This subgroup will brainstorm policy-level headlines, opportunities, audiences, and timing and make recommendations for feeding into post-2015 and global thematic discussions of education (e.g., EFA and MDG consultations).
    b. National-level engagement. How and when to approach those at country-level, and make sure that country-level stakeholders are engaged and that their perspectives are understood.
2. Discussion on audience: Should the LMTF focus on learning in low-income countries or all countries?
    a. The LMTF agenda should be "truly global" and aim to be globally relevant and improve learning at a global level, rather than focus solely on low-income countries.
    b. That said, the global approach must be nuanced, feasible and adaptable and:
        i. Allow for differentiation between and within country contexts, recognizing different goals and needs.
        ii. Recognize that implementation must be affordable and adaptable to different country contexts.
    c. It is important to emphasize that the focus is not on international comparison, but on learning within countries. While the task force is developing a global agenda and framework, its recommendations are ultimately intended to strengthen and support national efforts to measure and improve learning.
3. Discussion on beneficiaries: Should the LMTF focus on students within education systems or age-cohorts of all children?
    a. Measurement should be used to inform and improve teacher training and instruction.
    b. That said, the priorities of the LMTF include learning at both early childhood and postprimary levels in addition to primary. It is necessary to recognize skills, capacity and human development delivered within diverse contexts. Out-of-school children have different sets of competencies.
    c. Covering students in schools and including children in age-cohorts are not mutually exclusive. The task force may consider a phased approach, first looking carefully at how to improve learning in school systems, and then consider how to improve learning for children outside of school systems.
    d. Costs and feasibility must be recognized as key factors.
4. Collaboration: process for information-sharing and decisionmaking.
    a. Sharing information between working groups and the task force:
        i. While the working groups are timed sequentially, the chairs of each group will have regular contact with each other to ensure that each contributes to and understands the considerations of the others. The working group chairs are Seamus Hegarty of IEA (Standards), César Guadalupe Mendizábal of Universidad del Pacífico (Measures

and Methods) and a third chair (Implementation) to be determined.

ii. The structure of the working groups will be flexible so that participants across working groups can be convened to discuss specific issues if and as necessary.

iii. Working group progress will be shared with LMTF members in between the task force's face-to-face meetings and posted online.

iv. If a working group develops two options with strong support from participants, both approaches will be presented to the task force for debate.

b. Decisionmaking process: It was agreed that to the extent possible the LMTF should try to reach consensus on key decisions. A majority vote should be used only as a last resort, and in that case the Secretariat will maintain a careful record of dissenting opinions, rationale, and evidence presented.

5. Consultation and Outreach

a. LMTF members will act as champions for the project, sharing and promoting the recommendations widely.

b. Alignment with national-level efforts is critical. LMTF members should inform the Secretariat of simultaneous processes that relate to its work and opportunities for consultation.

c. LMTF members who represent large regions will work together to figure out how to engage their constituencies. The Secretariat will support this work.

d. All products will be posted on the Global Compact on Learning website to ensure transparency. LMTF members will receive regular updates via email as well.

e. Social media will be employed to disseminate task force messages, including active blogs that engage relevant audiences.

## First Working Group on Learning Standards

The LMTF Secretariat issued an open call for applications for the Standards Working Group in April 2012. Nearly 70 individuals responded to the call for applications. The Secretariat conferred with cochairs and several task force members to select 38 working group members in 15 countries (Canada, Ecuador, Egypt, Finland, France, Georgia, Hungary, India, Iraq, Kenya, Nepal, Pakistan, Senegal, the United Kingdom and the United States). Members were selected based on expertise in developing countries, knowledge of specific content areas, and geographic diversity.

The Secretariat recruited Professor Seamus Hegarty to chair the Standards Working Group. Professor Hegarty is an internationally renowned expert in education and has been Chair of International Association for the Evaluation of Educational Achievement since 2005. Prior to that, he was director of National Foundation for Educational Research for 12 years. He is a visiting professor at the Universities of Warwick and Manchester Metropolitan and Chair of the Advisory Board for the Observatory of Learning Outcomes based at the UIS. He was a member of the UK National Commission for UNESCO and Chair of its EFA Working Group from 2005-2010 and is a member of the Advisory Board for the Assessment for 21st Century Skills (ATC21S) project. He has been a member or chair of numerous research and advisory bodies for the European Commission, UNESCO, OECD and Council of Europe for over 30 years. He has acted as adviser and evaluator of research activity, frequently at national level, in

many countries. He has published widely on inclusive education, assessment and research management. He is founder editor of the European Journal of Special Needs Education, now in its 27th year, and edited Educational Research for 15 years.

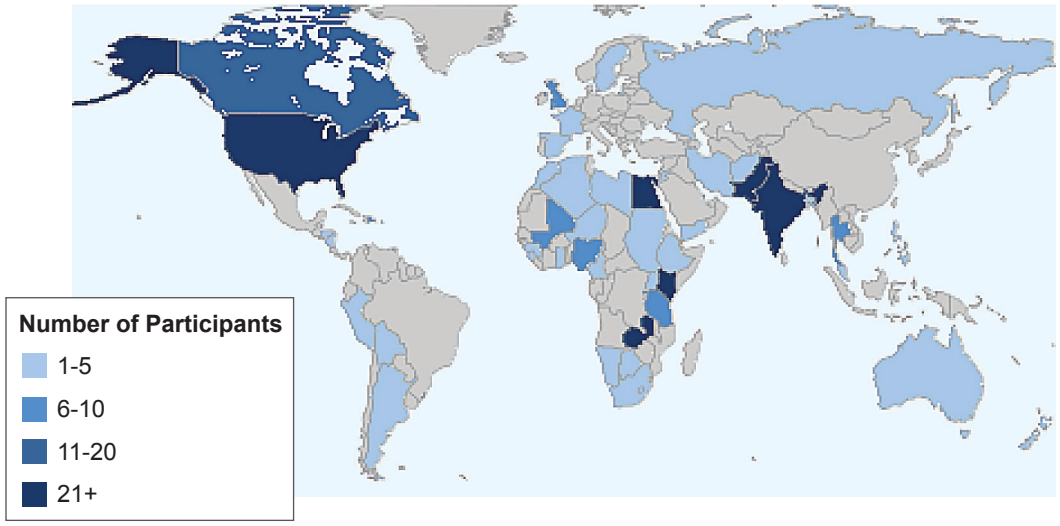
Professor Hegarty and the Secretariat facilitated the Standards Working Group from May—October 2012. The group worked virtually by completing individual assignments and participating in teleconferences, email discussions, and small group discussions. Subgroup leaders were selected to lead the discussions about early childhood, primary, and postprimary levels.

The group developed an initial document for consultation, "Proposed Competencies for Learning Outcomes," which was disseminated on August 5, 2012 (see annex E). Feedback was gathered through September 10, 2012 and the group worked to refine the domains and align them across age groups. These recommendations were described in a memo and working paper distributed to the task force prior to the September 27–28, 2012 meeting.

## First Public Consultation Period

Between August and September 2012, the Standards Working Group circulated a preliminary document, "Draft Competencies for Learning Outcomes: Early Childhood, Primary, and Post-Primary," for public comment, along with a consultation toolkit to help guide discussions. Documents were available in Arabic, English, French and Spanish. Nearly 500 people in at least 57 countries provided feedback by either participating in an in-person consultation or submitting comments electronically. Figure 1 (below) shows the geographic representation of participants in the standards consultation period. Figure 2 on the following page lists the countries and approximate number of participants.

### Figure 1. Geographic Representation in the Standards Consultation Period



## Figure 2. Countries and Approximate Number of Participants Represented in the Phase I Consultation Period

| Region | Participating Countries |
|---|---|
| Central Africa | • Cameroon (1) |
| Eastern Africa | • Ethiopia (1)<br>• Kenya (31)<br>• Mauritius (30)<br>• Rwanda (8)<br>• Seychelles (2)<br>• South Sudan (1)<br>• Sudan (1)<br>• Uganda (3)<br>• United Republic of Tanzania (8)<br>• Zambia (22) |
| Northern Africa | • Algeria (1)<br>• Egypt (31)<br>• Libya (1)<br>• Morocco (1) |
| Western Africa | • Ghana (4)<br>• Guinea (1)<br>• Mali (8)<br>• Niger (1)<br>• Sierra Leone (1)<br>• Nigeria (13) |
| Southern Africa | • Ghana (4)<br>• Guinea (1)<br>• Mali (8)<br>• Niger (1)<br>• Sierra Leone (1)<br>• Nigeria (13) |
| Central America | • Honduras (13)<br>• Nicaragua (42) |
| North America | • Canada (13)<br>• USA (42) |
| South America | • Argentina (1)<br>• Bolivia (1)<br>• Peru (2) |

| Region | Participating Countries |
|---|---|
| Eastern Asia | • Hong Kong (2) |
| South-eastern Asia | • Brunei (2)<br>• Malaysia (1)<br>• Philippines (5)<br>• Thailand (18) |
| Southern Asia | • Afghanistan (1)<br>• Bangladesh (1)<br>• India (32)<br>• Nepal (2)<br>• Pakistan (75) |
| Caribbean | • Dominican Republic (6)<br>• Jamaica (1)<br>• St. Kitts and Nevis (1)<br>• St. Lucia (1) |
| Eastern Europe | • Russian Federation (3) |
| Northern Europe | • Sweden (1)<br>• United Kingdom (6) |
| Western Europe | • France (5)<br>• Spain (1) |
| Middle East | • Iran (1)<br>• Jordan (5)<br>• Lebanon (1)<br>• Qatar (2)<br>• Yemen (1) |
| Oceania | • Australia (2)<br>• New Zealand (1) |

Several overarching themes emerged from the consultations:

- Respondents were pleased that learning was defined more broadly than literacy and numeracy. However, there was disagreement on how comprehensive the LMTF recommendations can be at the global level. The competencies were at the same time considered not comprehensive enough for applicability at the country level, and too comprehensive to be applicable at the global level. In particular, teachers and other practitioners advocated for a more comprehensive framework while academics and others working at the global level favored a more succinct set of domains.
- There was a request for alignment of terminology and domains across the age groups. In particular, science, critical thinking, and physical well-being were perceived to be absent from primary and postprimary. Based on this input, the working groups decided upon the seven domains described below, with the understanding that the capacity and demand for measuring them may vary greatly across age groups.
- The illustrative indicators were considered too specific and in some cases confusing, and there was a lack of consensus around which illustrative indicators could be applied across language groups and contexts. Therefore, the Secretariat collected these comments and provided them to the Measures and Methods Working Group, but decided to put forth a framework including only domains and subdomains for this first phase.
- There was much discussion about where the standards should be set. Some felt the competencies were too ambitious for the majority of countries and worried about setting standards where there were not material and human resources available to meet them. Others felt that the competencies were at the right level.

As a result of this feedback, the Standards Working Group made significant revisions to the recommendations framework. The group proposed seven domains and corresponding subdomains as important areas in which children should demonstrate learning:

- Physical well-being
- Cognition and problem solving
- Learning approaches and skills
- Language and literacy
- Social and emotional
- Numeracy and mathematics
- Science and technology

The working group and Secretariat used this feedback to prepare a draft working paper to inform the discussions of the task force at their first meeting.

## First In-Person Task Force Meeting

Task force members met in person for the first time on September 27–28, 2012, in New York City. During this first meeting of the task force, the cochairs and members engaged in discussion and debate around the first key issue to be addressed by the task force, specifically what domains of learning are important for children and youth for success in school and in their adult lives? Below is a list of attendees and a summary of the objectives, main topics, and outcomes of that discussion.

**Attendees**

| Task Force Members: | |
|---|---|
| **Organization** | **Representative(s)** |
| ActionAid International; Global Partnership for Education Board Representative for Northern Civil Society | David Archer, International Head of Education |
| African Union | H.E. Jean Pierre O. Ezin, Commissioner for Human Resources, Science and Technology<br>Beatrice Njenga, Head of Education Division |
| Arab League Educational, Cultural and Scientific Organization (ALECSO) | Mohamed-El Aziz Ben Achour, Director General |
| Association for the Development of Education in Africa (ADEA) | Dzingai Mutumbuka, Chair |
| Campaign for Female Education (Camfed) International; Global Partnership for Education Board Representative for Southern Civil Society | Lucy Lake, Chief Executive Officer |
| City of Buenos Aires | Maria de las Mercedes Miguel, Director General of Education Planning<br>Silvia Montoya, General Manager of Assessment and Educational Quality |
| Dubai Cares / United Arab Emirates | Tariq Al-Gurg, CEO<br>Beau Crowder, Director of Programs |
| Education International | Rob Weil, Director of Field Programs and Educational Issues, American Federation of Teachers |
| Agence Française de Développement (AFD) | Jean-Claude Balmes, Senior Advisor |
| Global Partnership for Education | Carol Bellamy, Chair of the Board<br>Jean-Marc Bernard, Senior Education Specialist |
| Government of Assam, India | Dhir Jhingran, Principal Secretary |
| International Education Funders Group (IEFG) | Chloe O'Gara, Cochair |
| Korean Educational Development Institute (KEDI) | Bangran Ryu, Director of School Policy Research Division<br>Chong Min Kim, Research Fellow |
| Ministry of Education of Kenya | George Godia, Permanent Secretary |
| Pearson | Michael Barber, Chief Education Advisor (Task Force Cochair) |
| Pratham | Rukmini Banerji, Director of Programs (Task Force Cochair) |
| South Asian Association for Regional Cooperation (SAARC) | Tareque Muhammad, Director, SAARC Secretariat |
| USAID | Katie Donohoe, Acting Director, Office of Education |
| U.K. Department for International Development (DFID) | Jo Bourne, Head of Education |
| United Nations Development Program | Shantanu Mukherjee, Team Leader (MDGs, Poverty Practice) |

| Task Force Members: | |
|---|---|
| **Organization** | **Representative(s)** |
| UNESCO | Qian Tang, Assistant Director-General for Education<br>Olav Seim, Director, EFA Global Partnerships Team<br>Philippe Kridelka, Director, UNESCO Office in New York<br>Lily Valtchanova, Liaison Officer, UNESCO Office in New York |
| UNICEF | Geeta Rao Gupta, Deputy Executive Director (Programmes) (Task Force Cochair)<br>Susan Durston, Associate Director, Education Programs<br>Changu Mannathoko, Senior Advisor, Education Section |
| Working Group on Implementation Chair | Shamsh Kassim-Lakha, Founding President of Aga Khan University, Former Minister of Education of Pakistan |
| Working Group on Standards Chair | Seamus Hegarty, Chair, International Association for the Evaluation of Educational Achievement (IEA) |
| World Bank | Beth King, Director of Education<br>Marguerite Clarke, Senior Education Specialist |

| Task Force Secretariat: | |
|---|---|
| **Organization** | **Representative(s)** |
| Center for Universal Education (CUE) at the Brookings Institution | Rebecca Winthrop, Senior Fellow and Director<br>Xanthe Ackerman, Associate Director<br>Kate Anderson Simons, Monitoring and Evaluation Consultant<br>Maribel Soliván, Learning Metrics Task Force Project Manager<br>Jenny Alexander, Center Assistant |
| UNESCO Institute for Statistics (UIS) | Hendrik van der Pol, Director<br>Albert Motivans, Head of Education Indicators and Data Analysis Section<br>Maya Prince, Research Assistant |

| Observers: | |
|---|---|
| **Organization** | **Representative(s)** |
| Australian Government Overseas Aid Program (AusAID) | Debbie Wong, Manager Education, Education Thematic Group |
| Centre for International Cooperation in Education Development (CICED) | Anastasia Maksimova, International Development Officer |
| University of Pennsylvania | Dan Wagner, UNESCO Chair in Learning and Literacy |
| McGill University | Ralf St. Clair, Professor, Department of Integrated Studies in Education |
| Pearson International | Amanda Gardiner, Head of International Affairs |

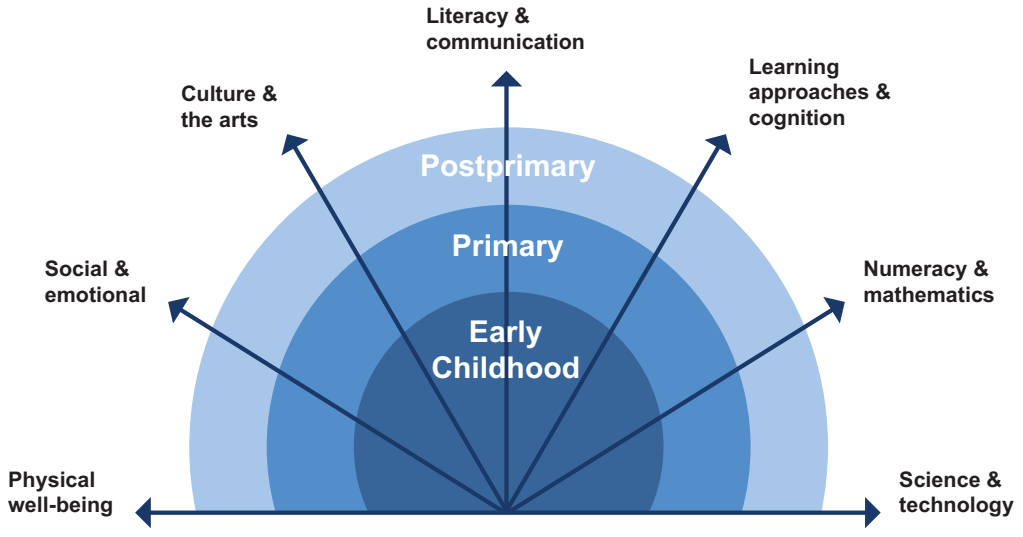
**Meeting Objectives:**

- Review the results of the consultation process
  - Seven domains (see Figure 1) were presented as important areas for learning competencies for all children and youth.
  - Subdomains within each of the seven domains were offered by the Standards Working Group to the Measures and Methods Working Group as guidance for areas of measurement.
- Discuss and make final decisions on the recommendations of the Standards Working Group.
- Discuss plan of action and identify additional opportunities for informing the post-2015 agenda.
- Discuss plan of action for engaging national-level stakeholders.
- Evaluate the LMTF process to date and identify improvements if necessary.

**Key Decisions:**

- Not all of the seven domains are feasible targets for a potential global learning goal; accordingly, the task force recommends exploring a hybrid approach to measuring learning at the global and national levels. Options for this approach will be proposed by the Measures and Methods Working Group and decided upon at the next task force meeting (February 20–21, 2013, in Dubai).
- The recommendations of the task force will encompass comprehensive basic education, from early childhood to the lower secondary level.
- The recommendations will seek to encompass children who are in school and those who are out of school, but the task force acknowledges that measuring learning of children in school may be more feasible.

## Figure 1: A Global Framework of Learning Domains[7]




*Note: This framework is intended for the purposes of the Learning Metrics Task Force to identify domains for measurable learning outcomes. It is not intended at this time to be used as a framework for policymaking, curriculum, or instruction.*

**Topics of Discussion:**

While the task force broadly accepted the working group's revised competencies framework, attendees engaged in lively discussion and debate on specific domains and subdomains, as well as larger questions about the project vision and scope. The following questions were major topics of discussion over the two-day meeting.

**How comprehensive should the learning outcomes framework be?**

The task force broadly accepted the framework for learning outcomes proposed by the working group, but with several changes:

- The domains of "learning approaches and skills" and "cognition and problem solving" were combined
- "Culture and the arts" was made a distinct domain rather than being incorporated into the "social and emotional" domain.
- The "language and literacy" domain was renamed to "literacy and communication," to encompass the various ways in which human beings communicate ideas, including through ICTs.

Subdomains were offered by the Standards Working Group as important areas for measuring learning within each of the seven domains. The subdomains are suggested areas for exploration by the next group and may be refined as the Measures and Methods Working Group develops its recommendations.

The framework that the task force agreed to put forth is depicted in Figure 1 (above). Task force members stated that this framework should be disseminated along with several caveats. First, the task force acknowledged that recommending a comprehensive framework for measuring learning could diffuse already limited resources in low- and middle-income countries. Second, the framework should be presented with a "caution label" (see Figure 1), stating that it is intended for exploring measures of learning outcomes and should not be used as a framework for curriculum, instruction, or policy-making. The task force decided that the Measures and Methods Working Group (convening from October 2012 to April 2013) should propose hybrid models for realistically measuring fundamental skills as well as more aspirational ones.

**Should the task force recommend global or national metrics?**

Related to the discussion on the comprehensiveness of the framework, the task force discussed the issue of global learning goals versus nationally defined goals. There was broad consensus that the task force should propose some type of global goal.

Several task force members called for a prioritization of the seven domains, especially for countries where some of the domains are not currently part of the national curriculum. The following alternatives were suggested:

- Propose one or two truly global goals against which all countries should measure progress, with several other goals that countries could opt in to measure.
- A "basket" approach wherein countries select and prioritize the domains based on national needs and interests.

The task force charged the Measures and Methods Working Group to propose models for how to measure progress toward a global learning goal, without narrowing the focus of learning to just one or two domains.

**Will the task force make recommendations for all children or only those who are in school?**

Task force members acknowledged that learning happens in many contexts including homes, communities, and schools. Some task force members advocated for focusing the recommendations for measuring learning on those children who are in school, especially in primary school, which is the level at which enrollment rates are highest worldwide. They reasoned that because school systems are the primary vehicles for improving learning in countries, they should be the principal focus of these recommendations. Others cited low enrollment numbers in preprimary programs and secondary school, especially in low- and middle-income countries, as reasons why the recommendations must extend to children outside formal school settings.

There was a consensus that, while the domains focus on competencies typically developed by children who are in school settings, the recommended measures should not focus exclusively on children who are in school. The Measures and Methods Working Group will provide recommendations on the feasibility of capturing learning data for out-of-school children. Existing methods of data collection, such as census and other household survey data, were suggested as an option for measuring learning beyond schools.

**Should learning be measured by age cohort or grade level?**

The discussion on age cohort and/or grade level was related to the discussion on whether the recommendations should apply to all children or only children in school. Some task force members pointed out that an age-based model would help keep countries accountable for the learning of all children, whether or not they are enrolled in school. Others felt that the varying ages at which children begin school globally would make grade levels a fairer way of measuring learning, especially in any internationally comparable way.

No consensus was reached on this issue. The LMTF requested that the Measures and Methods Working Group develop recommendations to answer this question. One task force member suggested a "learning stages" model rather than setting specific ages and grades at the global level. This model is loosely based on International Standard Classification of Education (ISCED). The LMTF Secretariat and Standards Working Group members proposed the model shown in Table 1 as one example of an age and grade level framework.

**Table 1. Proposed Learning Stages Framework**

| Stage | Level | Focus | Approximate Age at Which Learning Is Measured |
|---|---|---|---|
| Early Childhood | ISCED 0 (preprimary, including formal and nonformal) | School readiness | 5–7 |
| Primary | ISCED 1 (lower and upper primary) | Basic skills in literacy, numeracy and global citizenship | 11–12 |
| Postprimary | ISCED 2 (lower secondary) | 21st-century skills for work, life and future learning | 14–15 |

**How far into the education lifespan will the task force's recommendations extend?**

The task force discussed various options for how far into the educational lifespan its recommendations should extend. The ability of individuals to pursue lifelong learning was cited as an important goal for education. However, around lower secondary (ISCED 2), students begin to specialize depending on their academic performance, interests and life situations. Some children may discontinue formal schooling even earlier as they transition to parenthood or the workforce. The consensus was that the recommendations should encompass early childhood and basic education, defined by UNESCO as:

> the whole range of educational activities, taking place in various settings, that aim to meet basic learning needs as defined in the World Declaration on Education for All (Jomtien, Thailand, 1990). According to ISCED standard, basic education comprises primary education (first stage of basic education) and lower secondary education (second stage). It also covers a wide variety of non-formal and informal public and private activities intended to meet the basic learning needs of people of all ages (UIS Glossary, n.d., "Basic Education").

Several task force members advocated for the inclusion of technical and vocational education and training (TVET) and other workforce skills. Higher education and TVET are critical to sustainable growth, especially in low- and middle-income countries. The consensus was that while setting standards and recommending measures for specific vocations is beyond the scope of the task force, the proposed domains provide a foundation for children to move toward individual pathways for learning beyond lower secondary.

**Will the task force make recommendations for how assessments can be used to improve learning?**

Task force members discussed the importance of recommendations that were relevant and could be used to not only measure learning, but also improve learning based on the data. The current scope of the task force does not allow for producing detailed guidance on how to use assessment results to improve learning, but the Implementation Working Group will address some of these issues and develop recommendations to the extent it can given its limited time frame. One task force member recommended developing a "how-to" guide on achieving learning in the seven domains. Another called for recommendations on how countries and civil society organizations can learn from each other, encourage local efforts, and "cross-fertilize" their efforts. There was a broad consensus that the recommendations of the Implementation Working Group should address the mechanisms through which assessments of learning could improve learning outcomes, but some members cautioned that given the time constraints, it is not realistic to expand the project scope. This question was left open for discussion, and its answer will likely depend on the outcomes of the next task force meeting.

**What is the timeline for proposed learning goals?**

Task force members raised several questions regarding the urgency of the goals and how ambitious the task force can be with its recommendations. Task force members acknowledged the fact that country-level improvement on existing internationally comparable learning measures (PISA, TIMSS, PIRLS) is quite slow, and some countries are even making negative progress. Members agreed that the timeline for a learning goal should align with other global goal-setting efforts (SDGs, MDGs, EFA), but the exact levels of

learning that countries should aspire to are yet to be determined.

In sum, the proposed competencies framework represents the task force's vision for what every child everywhere should learn and be able to do, whether at the classroom, system, or global level, by the time they complete post-primary education. All seven domains should remain the aspiration for every child throughout the education lifespan.

Ultimately the LMTF would like to identify strong, helpful measures for each of these domains, and from there develop guidance on how to improve outcomes in these areas at the classroom, school, and system levels. While we anticipate that as a community our global assessment capability will improve greatly through collaborative efforts, adequate measures in all of these areas do not yet exist at the global level.

The task for the Measures and Methods Working Group is to determine what subset of domains can be measured globally within our current capacity. The LMTF also encourages local assessment development in the remaining areas, so that over time insights into measuring them are gained. Further, while focusing on a smaller subset of domains, the education community should also build systems to promote learning in other domains (for instance, working to increase the cadre of teachers who are able to teach science effectively prior to participating in science assessments).

# Annex E: First Public Consultation Document

**Learning Metrics Task Force**

**Proposed Competencies for Learning Outcomes:**
**Early Childhood, Primary, and Post-Primary**

**DRAFT FOR CONSULTATION: Please send feedback to metrics@globalcompactonlearning.org before August 24, 2012, to be included in recommendations**

## Background

The Education for All (EFA) goals initiated in 1990 in Jomtien, Thailand, demonstrated a global commitment to meeting basic learning needs. This commitment was restated in 2000 in Dakar Framework for Action Goal 6: to "[improve] every aspect of the quality of education, and ensuring their excellence so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills."

Yet today there is growing evidence that millions of children and youth do not have the basic skills and knowledge necessary to succeed in school and life. In response, the Learning Metrics Task Force aims to shift the conversation in education from a very heavy focus on access to access plus learning.

As EFA and the Millennium Development Goals (MDGs) sunset in 2015, and the UN secretary-general prepares to launch a global education initiative, there is a window of opportunity for education actors to ensure that learning for all is a central component of the global development agenda. To achieve this, the education community must build consensus on a set of learning goals that can be measured and achieved globally.

**The Learning Metrics Task Force**

In response to this need, UNESCO and the Center for Universal Education (CUE) at Brookings have joined efforts to convene a Learning Metrics Task Force that will investigate the feasibility of identifying common learning goals to inform the post-2015 global development policy discourse and improve overall learning. The task force is led by three cochairs and is comprised of representatives from UN agencies, regional organizations, national governments, bilateral donors and civil society organizations who have political influence at the global or regional level, technical knowledge of the evaluation of learning, and capacity to move learning forward on the global development agenda.

Based on recommendations from technical working groups and input from broad global consultations, the task force will make recommendations for learning competencies and measures at the early childhood, primary and postprimary levels. (Note that for this exercise, "learning" is not just literacy and numeracy but is conceived more broadly.) These recommendations will be designed for use globally, building off and complementing efforts to measure learning that are already under way at national and regional levels. The task force acknowledges, however, that the way in which its recommendations are translated into prescriptions for action will vary across countries.

Currently scheduled for release in September 2013, the final report from the task force will include:

- Recommendations for a set of learning competencies from early childhood through postprimary.
- Recommendations for how the competencies should be measured.
- Recommendations for how countries and regional and global organizations can implement these measures to improve learning opportunities and outcomes for children and youth.

Any effort to develop a shared vision for global learning goals and targets must be open, inclusive and transparent. To that end, the task force seeks input from a wide variety of stakeholders through a global consultation process to be conducted both online and in person.

**Phase I: Proposed Learning Competencies**

In June 2012, a technical working group of international experts from research institutions, governments, nongovernmental organizations, private sector companies and UN agencies met electronically to develop recommendations for learning competencies at the global level. Members were recruited through an open application process and were selected based on their experience developing, implementing, and/or measuring progress toward learning standards. The working group is chaired by Professor Seamus Hegarty, chair of the International Association for the Evaluation of Educational Achievement (IEA).

The working group has provided recommendations for competencies at three levels: early childhood, primary and postprimary. The group will continue to work virtually from June through October 2012 to further develop a recommended set of competencies and describe the rationale for them, and illustrate how these competencies can be measured at the global level. Subsequent working groups will address the measurement tools and methodologies required for assessing learning at the global level and strategies for implementing global learning metrics to improve learning outcomes.

This document describes a proposed outline of knowledge, skills, attitudes and values that are important for children and youth to have in the 21st century. The competencies are described in terms of domains, subdomains and illustrative indicators that may be used as a basis for measuring progress toward the competencies.

There is much debate in the global education community around the terminology used to describe learning outcomes and assessments. At the global level, terms such as “standards,” “competencies,” “guidelines” and “outcomes” carry different meanings and connotations. The LMTF aims to contribute to these discussions on terminology as it builds consensus among the education community. For the purposes of this document, key terms are defined as follows:

- **Competencies:** knowledge, skills, attitudes and values that are learned or developed
- **Domains:** broad categories of learning outcomes
- **Subdomains:** specific categories of learning outcomes
- **Illustrative outcomes:** examples of how competencies are demonstrated

The proposed competencies should be viewed as one component of an education program. According to the Dakar Framework for Action, guidance on EFA Goal 6:

> Successful education programmes require: (1) healthy, well nourished and motivated students; (2) well-trained teachers and active learning techniques; (3) adequate facilities and learning materials; (4) a relevant curriculum that can be taught and learned in a local language and builds upon the knowledge and experience of the teachers and learners; (5) an environment that not only encourages learning but is welcoming, gender-sensitive, healthy and safe; **(6) a clear definition and accurate assessment of learning outcomes, including knowledge, skills, attitudes and values;** (7) participatory governance and management; and (8) respect for and engagement with local communities and cultures . (UNESCO, The Dakar Framework for Action, 2000, 17; emphasis added)

While the competencies described here are meant to address point 6 above, they provide a foundation for subsequent phases of the Learning Metrics Task Force, which will aim to achieve the overall goal of developing recommendations for how assessment of learning can provide a knowledge base through which to assess and improve education systems in the areas listed above.

## Proposed Competencies for Early Childhood

The competencies listed here for the early childhood years begin developing in children at birth, but are typically demonstrated in the two to three years prior to primary school entry. In addition to these learning outcomes it is critical that systems serving young children first focus on developing conditions for learning during the early years: adequate health and nutrition, parenting supports and quality early childhood development programs. While these guidelines are offered for typically developing children, it is important to note that children’s developmental trajectories vary widely in the early years.

| Domain | Subdomains | Illustrative Outcomes |
|---|---|---|
| **Language and Literacy** | • Receptive language skills<br>• Expressive language skills<br>• Vocabulary | Communicates effectively in primary language(s) of communication |
| | • Phonological awareness<br>• Alphabet knowledge<br>• Print concepts and conventions<br>• Early writing | Shows beginning knowledge of the primary written language(s) of communication |
| **Cognition and General Knowledge** | • Reasoning and problem solving<br>• Early critical thinking skills | Able to think through problems and apply strategies for solving them |
| | • Number sense and operations<br>• Spatial sense and geometry<br>• Patterns and classification<br>• Measurement and comparison<br>• Representing and interpreting data | Demonstrates knowledge of basic quantitative and numeric concepts |
| | • Inquiry skills<br>• Conceptual knowledge of the natural and physical world | Shows emerging ability to gather information about the natural and physical world and organize that information into knowledge and theories |
| **Physical Well-Being and Motor Development** | • Physical health status<br>• Health knowledge and practice<br>• Gross motor skills<br>• Fine motor skills | Develops physical well-being in accordance with potential, use of the body, muscle control, and appropriate nutrition, exercise, hygiene, and safety practices |
| **Social and Emotional Development** | • Awareness of body parts<br>• Empathy<br>• Self-concept<br>• Self-esteem<br>• Emotional knowledge and expression | Develops positive view of self and others |
| | • Self-regulation | Shows culturally appropriate emotional expression, regulation, and knowledge |
| | • Social competence<br>• Pro-social behaviors<br>• Awareness of and Respect for diversity<br>• Conflict resolution | Demonstrates positive, culturally appropriate interactions with peers and adults |
| | • Moral values<br>• Family/cultural/religious knowledge | Demonstrates awareness of self in family and community |
| **Approaches to Learning** | • Curiosity<br>• Initiative | Takes initiative and shows interest in varied topics and activities |
| | • Planning<br>• Problem solving | Begins and finishes activities with persistence and attention |
| | • Cooperation<br>• Leadership | Demonstrates interest and engagement in group experiences |
| | • Creative arts (art, music/movement, drama) | Approaches tasks with creativity |

## Proposed Competencies for the Primary Level

These competencies outline, at the most basic level, what all students should know and be able to do after receiving primary education. The resulting competencies are not intended to preclude students who are trying to achieve subsequent education goals. Therefore, depending on the needs of the student population, a country may develop additional indicators that address specific learning needs of its population and national goals.

It is important to note that the time frame in which children acquire basic literacy skills varies depending on contextual factors such as:

- Nature and quality of the schooling system
- Linguistic issues, including in particular the relationship between mother tongue and language of instruction

| Domain | Subdomains | Illustrative Outcomes |
|---|---|---|
| **Language and Literacy** | • Phonemic awareness<br>• Phonics | Masters sounds and symbols in the language of instruction by the end of primary year 1<br>Segments words into individual phonemes.<br>Decodes simple words |
| | • Oral fluency<br>• Oral comprehension | Speaks and understands basic interpersonal and academic language by the end of lower primary |
| | • Reading fluency<br>• Reading comprehension | Reads grade level text with fluency by the end of lower primary<br>Answers text-based comprehension questions, including text-based inference questions by the end of lower primary |
| | • Receptive vocabulary<br>• Expressive vocabulary | Uses vocabulary and recognizes sight words for the most frequent words in the language of instruction |
| | • Strategies when encountering new words | Uses strategies for learning new words including decoding, use of pre- and suffixes, context clues, and background knowledge |
| | • Written expression/ composition<br>• Spelling<br>• Grammar | Writes simple original texts by the end of lower primary<br>Writes for a variety of purposes by the end of upper primary following accepted norms for language and culture |
| | • Reading to learn | Reads for understanding in a variety of genres by the end of upper primary<br>• Fiction<br>• Non-fiction<br>Reads for specific information |

| Domain | Subdomains | Illustrative Outcomes |
|---|---|---|
| **Mathematics** | • Number sense<br>• Operations<br>• Number fluency<br>• Number systems<br>• Estimation | Demonstrates mastery of number concepts and operations |
| | • Measurement<br>• Data analysis and interpretation<br>• Economics and business<br>• Health and science<br>• Computer skills/calculator use | Applies understanding of numbers to multiple situations |
| | • Geometry<br>• Sequencing<br>• Patterns | Demonstrates spatial skills and reasoning |
| **Social and Civic Awareness** | • Ethical values<br>• Cultural norms<br>• Conflict resolution<br>• Coexistence | Develops pro-social behaviors |
| | • Arts<br>• Creativity<br>• Music and movement<br>• Drama | Develops aesthetic values consistent with cultural, contemporary, and historic norms |
| | • National and international expectations<br>• Social responsibility<br>• Environmental awareness and appreciation | Develops awareness of and appreciation for the environment, other cultures, nations and the international community<br>Appreciates and respects the dignity of work |
| **Technology** | • Using keyboard<br>• Email<br>• Web searches | Develops basic computer literacy skills |
| | • Data gathering<br>• Evaluating information<br>• Communicating | Develops awareness and appreciation of the role of technology and digital media. |

## Proposed Competencies for the Postprimary Level

The competencies listed here are intended for individuals who have studied beyond the primary level. They are designed to be self-contained and inclusive, so that they can represent learning beyond the primary stage for individuals who have studied at that level, or include the primary stage for those who are new to study. It is important to note that all of these outcomes must be understood in the specific context of the individual, and the indicators will manifest in both personal and work-related areas of life.

| Domain | Subdomains | Illustrative Outcomes |
|---|---|---|
| **Communication** | • Writing<br>• Reading<br>• Digital media<br>• Speaking and listening | Writes meaningfully for a variety of purposes<br>Reads with understanding and in order to learn<br>Engages effectively with digital technologies and electronic media<br>Speaks and listens in a variety of contexts<br>Preserves and transfers traditional knowledge |
| **Numeracy** | • Personal finance<br>• Economics<br>• Business mathematics | Applies mathematics effectively to everyday activities<br>Manages personal and business finances |
| **Interaction** | • Collaboration<br>• Social responsibility<br>• Civic engagement<br>• Environmental awareness | Works collaboratively with others<br>Engages in civil society<br>Responds to the social, cultural, and natural environment in positive ways |
| **Problem solving** | • Metacognition<br>• Innovation<br>• Critical decisionmaking | Applies metacognitive strategies to tasks<br>Researches innovative solutions to problems<br>Implements critical decisionmaking processes |
| **Workplace skills** | • Self-direction<br>• Quality of work<br>• Skill development<br>• Reliability | Shows self-direction and initiative in educational and workplace efforts<br>Able to turn ideas into action<br>Ensures high quality of work<br>Develops and maintains appropriate skill levels<br>Demonstrates reliability and effective use of time |

# Endnotes

1. For a list of task force members, see page ii of this report.
2. The background paper is available online at http://www.brookings.edu/~/media/Centers/universal%20education/learning%20metrics%20task%20force/LMTF_Paper_1_Multi_Country_Assmts_6_July.pdf.
3. Three subdomains related to written language were intentionally excluded from the literacy and communication domain for early childhood: phonological awareness (the ability to perceive and manipulate the sounds in a language) symbol knowledge (correspondence of alphabets, characters, etc. with spoken sounds), and early writing. The task force decided that given the large disparities in young children's access to print materials and varied orthographies it was not possible to expect mastery in symbol knowledge and early writing at a global level in the years before primary school. Furthermore, phonological awareness is often conceived of and measured through children's awareness of concepts such as recognizing beginning and ending sounds in words (onset and rhyme) and hearing syllables, which are difficult to measure if a child has not been exposed to games or instructional exercises which emphasize these skills.
4. Phonemic awareness and phonics were intentionally excluded from the framework due to the fact that these subdomains emerge at different stages depending on the language and script, and may not be appropriate to measure in some orthographies. The task force also felt that it was important to focus on the endpoint (e.g., reading and speaking with fluency) at the global level and leave the intermediate competencies to be decided at the local and/or national levels.
5. "Countries" refers to any country where the assessment is used, either at the national or subnational level.
6. The LMTF Secretariat made every effort to track the number of participants who reviewed the draft competencies and gave feedback; however, the numbers are likely an underestimate as some organizations and groups submitted feedback without a participant list.
7. Each arrow in the diagram represents one domain of learning, radiating outward as a child expands his or her knowledge in a given area. The half circles represent three time periods in which the task force will concentrate its recommendations: early childhood (birth through primary school entry); primary, and postprimary (end of primary through end of lower secondary). The diagram does not assume that all children will reach learning outcomes at the same point in time or that progress will be even across domains. The arrows extend outward from the diagram indicating that an individual may continue learning more deeply in a given area at the upper secondary, tertiary or technical/vocational level or through non-formal learning opportunities.

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For more information about the Learning Metrics Task Force, please visit www.brookings.edu/learningmetrics.


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