



LEARNING RECOVERY: POST-COVID 19

A review of literature from
East Asia and Pacific on strategies
for tackling the learning crisis.

FOREWORD

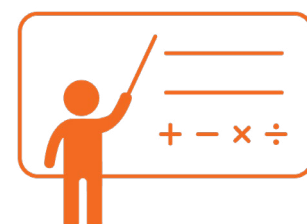
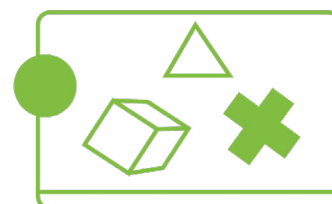
Prior to the COVID-19 pandemic, one in four children in the East Asia and Pacific region was failing to master basic literacy and numeracy skills in primary school. The COVID-19 pandemic has worsened the situation of learning for millions of children whose education has been interrupted by school closures. An estimated 10.5 million students in the Asia–Pacific region are at risk of not returning to school.

Education systems are struggling to help children recover the learning they have lost during the school closures to date – while still addressing the causes of the learning crisis that existed before the pandemic. Children who were struggling to learn before the pandemic and those from disadvantaged communities are at the core of the learning challenge in East Asia and Pacific.

This technical report reviews evidence from the region on strategies that have proven effective at improving learning for the most marginalized children in primary school. It aims at helping countries reflect on and draw from successful experiences in the region when designing their responses to the learning crisis. And it explains the urgent need to support learning recovery for those children whose schools closed at any time during the pandemic.

While the COVID-19 pandemic has brought about a number of challenges, the crisis can be taken as an opportunity to strengthen foundational learning for children. UNICEF is a strong proponent of ensuring equitable access to learning opportunities for all children. We will continue to strive for the best educational and life course outcomes in the East Asia and Pacific region, especially for the most vulnerable children.

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ABBREVIATIONS

ADB	Asian Development Bank
ANLAS	Analysis of National Learning Assessment Systems
ASEAN	Association of Southeast Asian Nations
EGRA	Early Grades Reading Assessment
ISCED	International Standard Classification of Education
NEQMAP	Network on Education Quality Monitoring in the Asia-Pacific
PASEC	Programme for the Analysis of Education Systems
PILNA	Pacific Islands Literacy and Numeracy Assessment
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
SD	standard deviation
SDG	Sustainable Development Goal
SEA-PLM	South East Asia Primary Learning Metrics
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children’s Fund



EXECUTIVE SUMMARY

Prior to the COVID-19 pandemic, an estimated 50 million primary school-age children in the East Asia and Pacific region were failing to learn basic foundational skills in core subjects, such as language, mathematics and science (UNESCO, 2017b). Up to 80 per cent of children in some countries fail to master foundational reading, writing and mathematics skills by the end of primary school (UNICEF & SEAMEO, 2020). COVID-19-related school closures stand to exacerbate the learning crisis across the region.

The loss of learning due the COVID-19 pandemic has affected all children. But those who were struggling to learn before school closures and those from disadvantaged communities are likely suffering the greatest learning losses. The United Nations Educational, Scientific and Cultural Organization (UNESCO) estimates that 10.5 million students in the Asia–Pacific region are at risk of not returning to school, and millions of students are at risk of falling behind and increasing the gaps in learning achievement.

Due to the COVID-19 pandemic, the negative impact on education is likely to be strongest in countries with already low learning outcomes, high dropout rates and less-resilient education systems. Long school closures may lead to learning loss in the short term, but they also mean losses in human capital and economic opportunities over the long term. According to a recent World Bank study, COVID-19-related school closures are pushing countries off track in terms of achieving their learning goals. And ultimately, the students currently in school are expected to lose US\$10 trillion in labour earnings over their combined work life (Azevedo et al., 2021).

Foundational literacy and numeracy skills are critical to thriving in an ever-changing world. Children must master foundational skills to move on to higher-level skills, such as application of knowledge, problem-solving and critical thinking, and to optimally develop other twenty-first-century skills, such as creativity, collaborative teamwork and communication. Getting this right is an essential precondition for children to succeed in their educational pathway and for their future integration into labour markets and as active members of society.

Addressing the learning crisis and COVID-19-related learning recovery requires a programmatic shift, from improving education quality to improving learning. Access to quality education is important but not necessarily sufficient, especially for the most disadvantaged children. Children struggling to learn require targeted programmes designed explicitly to improve their learning. This literature review highlights recent evidence that points to effective strategies for improving learning outcomes among the most vulnerable and marginalized children in primary school in the East Asia and Pacific region. Generally, the review:

1. Presents an overview of the learning crisis in the East Asia and Pacific region, with emphasis on primary education and the most marginalized children.
2. Identifies, compiles and assesses qualitative and quantitative evidence on the topic of learning outcomes around five common intervention areas.
3. Synthesizes the findings of the reviewed studies on promising approaches to improve learning outcomes within each of the selected topics.

The learning crisis in East Asia and Pacific is a crisis of foundational literacy and numeracy skills and is particularly impacting the most marginalized children.

The most disadvantaged children likely will suffer the most from the learning crisis and learning loss during the COVID-19 school closures, which will further widen learning gaps.

Prior to the pandemic, there were clear equity gaps in learning levels between different groups of children in East Asia and Pacific. These will likely widen further due to the school closures. Efforts to improve learning outcomes must focus on closing these equity gaps. The literature review identifies the following equity gaps in learning outcomes:

Overall, girls perform better than boys, but girls are far from reaching optimal learning across all subject areas and grades. The 2019 Southeast Asia Primary Learning Metrics results show that girls are more likely to perform better than boys, regardless of socioeconomic status or school location. But there is also evidence from East Asia and the Pacific that girls might be at a greater disadvantage in information and communications technology (ICT)-based learning environments – meaning, they may face more barriers to remote learning platforms (Elwood & Maclean, 2009).

- Children from non-dominant language groups or those who speak a language different from the language of instruction perform worse in general in terms of learning outcomes.
- Children from the poorest households and those living in rural or hard-to-reach areas might face significant barriers to learning.
- Children with disabilities may experience a wide disparity gap in learning outcomes in East Asia and Pacific when compared with their peers from better-off communities, although little is known about their learning levels.
- Children who experience emergencies, live in conflict situations or experience displacement are also at a higher risk of psychological or developmental difficulties that lower their academic achievement (Murphy et al., 2018).
- Children who have attended preschool perform better than children who have not attended preschool.
- Children who live with multiple disadvantages may endure the most difficulty in learning.

Foundational literacy and numeracy skills are at the core of the learning crisis. As in any region, there is substantial variation in East Asia and Pacific across and within countries in terms of reading and mathematics skills. Many children demonstrate advanced early literacy and numeracy skills. Among low-performing children, there is evidence that their low performance is rooted in the lack of mastery of foundational literacy and numeracy skills. Low-performing children are failing to learn these skills in the early years of primary school. By the time they get to the later years of primary school, they are unable to advance to the higher-order skills. Thus, in most countries, children tend to perform below expectations on higher-order reading skills (reading comprehension and analytical capacity).

For example, the 2019 Southeast Asia Primary Learning Metrics results reflect a large variation in children’s reading abilities across countries in the region. The number of Grade 5 children struggling to learn foundational skills ranges from 10 per cent in some countries to 80 per cent in others. In the countries participating in the SEA-PLM programme, about 2.2 million children in Grade 5 had difficulty to achieve foundational language skills in early grades (UNICEF &



SEAMEO, 2020). The COVID-19 pandemic and related school closures have exacerbated this learning crisis by denying children across the region sufficient face-to-face learning in the early years of primary school.

The 2019 Southeast Asia Primary Learning Metrics results show that in many countries, higher-order skills were already limited at the end of primary school. For example, in Cambodia, the Lao People's Democratic Republic, Myanmar and the Philippines, small to modest percentages of Grade 5 children achieved the highest proficiency level of reading, which requires "understanding texts with familiar structures and managing competing information" and the second-highest proficiency level, which requires "making connections to understand key ideas" (UNICEF & SEAMEO, 2020). Both of these are expected levels of reading proficiency at the end of primary education.

The reasons for the learning crisis are rooted deep in education system inefficiencies.

An analysis of the reasons for the learning crisis are beyond the scope of this review. However, other analyses link low levels of foundational skills to the poor quality of education. Teachers and school principals sometimes struggle to identify the best way to encourage learning in their students, while education systems struggle to support them in their pedagogic functions. Teachers are often not trained with specific pedagogic strategies to teach foundational literacy and numeracy skills. Formative assessment is not a common practice in the region. Education sector plans often stop short of clear action plans to improve learning by not focusing on broader reforms of education inputs.

Efforts to improve student learning within education sector planning require a strong analytical framework to first understand the processes that affect student learning as well as a monitoring framework to provide measurement data for all children. Prior to the pandemic, around half of the countries in the East Asia and Pacific region were considered not well prepared to measure or monitor learning outcomes despite the use of national student assessments (UIS, 2016). Given the learning loss from school closures, this monitoring is now more important than ever.

Evidence from the region points to effective strategies for addressing the learning crisis and COVID-19-related learning loss.

Understanding strategies that have been effective at improving learning outcomes in the region can help countries' efforts to address learning recovery and to reduce the learning crisis in the long run. This review therefore presents evidence from the region on strategies for improving learning that have proven effective. The evidence reviewed falls into five broad programmatic categories: interventions to improve early learning, the learning environment, remedial learning interventions, learning assessment and teacher quality. The following summarizes those findings.

Improving quality early learning opportunities is a fail-proof investment in improving foundational literacy and numeracy. Children with access to structured and high-quality early education options before primary school and those who have a well-structured supporting transition into primary education are better prepared to learn. Structured school readiness programmes in the early years of primary school show big potential for increasing foundational learning skills. Evidence from the region suggests that countries should:

- continue, increase and protect investment in quality early learning programmes and programmes that support the transition to primary school, especially for marginalized children;

- introduce a play-based early childhood education curriculum for positive impacts on learning;
- develop tailored school-readiness and catch-up programmes in the first three years of primary education to strengthen foundational learning outcomes;
- support positive transitions from pre-primary to primary school to encourage positive emotions towards school, which are crucial for learning; and
- design targeted preparation for teachers of children in the pre-primary setting as well as in the early years of primary education.

Improving the quality of the primary school learning environment is important to support children’s learning. A variety of school and classroom-based inputs affect children’s learning in the early grades of primary education. These include infrastructure, curriculum, teaching and learning materials and access to ICT. Evidence shows that high-quality inputs can improve learning outcomes when accompanied by substantial teacher training and support for maximum impact. Infrastructural improvements can improve school participation and hence improve learning – but only in the most disadvantaged schools.

Digital skills are essential for twenty-first-century learners. COVID-19 has made such skills immediately critical and, at the same time, created a critical skill gap among most learners and teachers. Evidence from past experience shows that ICT interventions present new opportunities to boost learning among children falling behind. But, it must be accompanied with appropriate training and support for teachers and learners. Evidence is limited in the region, however, on the impact of digital learning platforms on children’s learning. The recent remote learning programmes due to COVID-19 restrictions present the opportunity to research and better understand the strengths, weaknesses and opportunities that ICT in education has generated.

Structured remedial catch-up programmes targeting low-performing or at-risk children are an essential strategy for the region to recover learning lost from school closures and to close equity gaps in learning. Targeted and tailored investments in learning programmes for the most vulnerable learners are critically needed. This review found that the surest strategy for improving foundational literacy and numeracy skills is a structured learning intervention that explicitly targets the skills needing improvement. Regional evidence for this comes from early grade reading and mathematics interventions, mother tongue and multilingual education programmes and structured school readiness catch-up programmes. Other effective strategies are well-designed incentive programmes and universal design learning interventions. Evidence from the region shows that countries should consider:

- designing targeted learning programmes for specific groups of low performers and/or disadvantaged groups of children as a ‘core’ focus of primary education departments to ensure ‘teaching at the right level’;
- expanding investments, particularly in mother tongue and multilingual education programmes, early grade reading support programmes and remedial catch-up programmes, all of which have some of the highest returns on learning outcomes;
- introducing incentive programmes for students and parents, such as cash transfers and/or scholarships, that can impact children’s learning when effectively implemented; and
- promoting universal design of learning interventions for boosting learning among children with disabilities.



Measurement and monitoring of learning outcomes can help improve learning when data are applied to policies and plans. Assessments of learning outcomes of all types – from formative assessments at the classroom level to international large-scale assessments – are a critical strategy for recovering lost learning and addressing the learning crisis. The review encourages countries to reflect on:

- strengthening the feedback loop between assessments and policy development and planning to ensure that assessments and monitoring leads to better curriculum alignment, learning and teaching practices as well as appropriately targeted interventions (grades, learning domains, skills, groups of children, teachers and/or schools);
- strengthening formative assessments at the classroom level;
- strengthening long-term implementation of relevant national and cross-national representative assessments to track progress over time, grades, targets and subgroups of children and schools; and
- using dialogue and consensus to define remedial actions as part of the assessment mechanisms.

Efforts to improve teachers' professional development are central to improving learning outcomes and recovery of learning lost due to the COVID-19 school closures.

Teachers are at the heart of boosting learning for low performers. Broad reforms are necessary in almost all countries to improve the teaching force. But in the immediate term, the most successful strategies for helping struggling students may be through structured pedagogy programmes specifically aimed at helping teachers teach foundational literacy and numeracy or other missing skills. The review suggests the following could be effective practices:

- recruiting experienced candidates for the teaching force (preferably from the same linguistic groups as their students) and provide quality professional education programmes and more in-depth training;
- renewing and innovating teacher and school leadership preparation systems to prepare them for shifts in curricula, materials or assessment systems;
- including formative assessment practices in all teacher preparation systems;
- investing in structured pedagogy and teacher mentoring programmes, particularly for teachers of children falling behind, and encouraging a practical, hands-on approach;
- establishing clear education and career pathways to improve teacher motivation through certification programmes, improvements in compensation structures, better school leadership and clearer appraisal systems; and
- introducing iterative assessments of teachers' practices as well as coaching and mentoring opportunities to facilitate targeted improvements in teaching practice.

These findings are based on existing evidence. More research, however, is needed on the impact of interventions to improve quality and student learning outcomes.

Countries and education partners in the region still have much to learn. Stronger research and evidence on learning among marginalized groups of children are needed because these groups are largely excluded from large-scale assessments. Better monitoring and evaluations of promising interventions that may improve learning outcomes in the region are also needed. Factors that contribute to teacher motivation to facilitate better learning outcomes is another research area with untapped potential.

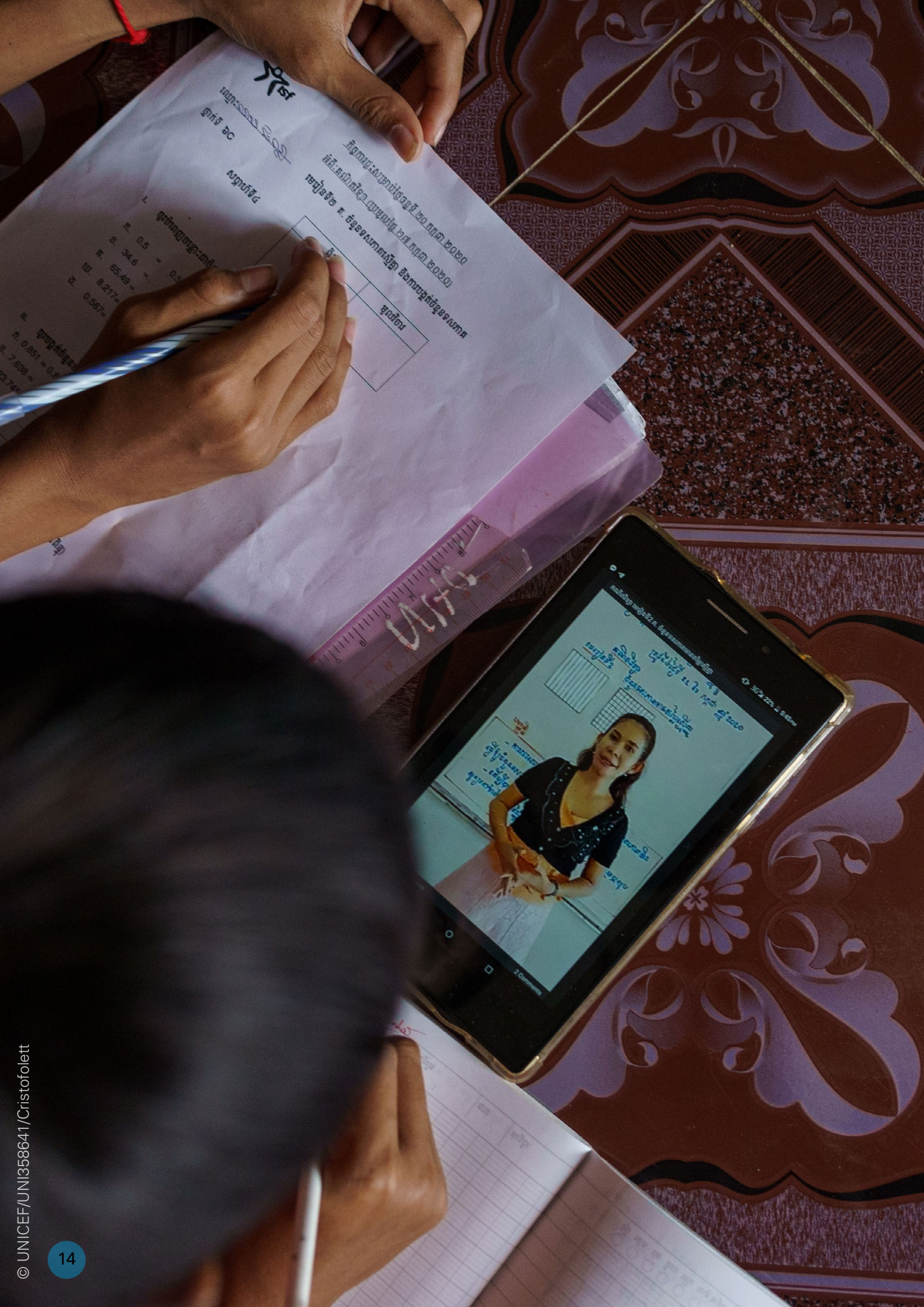
Evidence shows that we already know the solutions to the learning crisis, but we need to put them into action.

To support the recovery of learning lost due to the COVID-19 school closures and to improve learning overall and recover learning lost, policymakers need to shift their thinking from just improving the quality of education to improving learning. This requires, in some cases, questioning or re-evaluating assumptions about the links between investments in quality education and the actual impact on students' learning. The findings of this review provide useful insights for policymakers. The hope is that these findings will trigger reflections at the national and subnational levels around ongoing programmes and areas for improvement. The following are five important messages for policymakers.

1. Increase investments in early learning programmes and school readiness catch-up programmes in the first three years of primary education and keep quality at the centre of all such investments.
2. Invest more in targeted learning programmes for disadvantaged and excluded children and populations. Make such programmes the 'core business' of primary education departments. Expand investments in mother tongue and multilingual education programmes and early grade reading support programmes, which have some of the highest returns on learning outcomes.
3. Invest in strategic and systematic monitoring of learning outcomes through better programme evaluations, better quality national assessment systems and more participation in regional and international learning assessments. Develop new tools to align with twenty-first-century curricula and learning. Improve the use of such tools for education policy decision-making, sector planning and budgeting.
4. Renew and innovate teacher and school leadership preparation systems and establish clear pathways for education and careers. Review and improve pre- and in-service training systems. Invest more in structured pedagogy programmes, particularly for teachers of children falling behind. Recruit better-quality candidates for the teaching force. Include formative assessment practices in all teacher preparation systems.

Invest in improving and diversifying channels for learning twenty-first-century skills and strengthening digital learning platforms and environments. Maintain strong monitoring and evaluating of the learning results of those interventions, particularly as they relate to COVID-19 remote learning platforms.





1

REVIEW OF THE LEARNING CONTEXT IN EAST ASIA AND THE PACIFIC: BACKGROUND, OBJECTIVES AND METHODOLOGY

1.1 Context

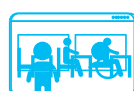
To ensure relevant and effective learning outcomes, the fourth Sustainable Development Goal (SDG 4) calls for all girls and boys to complete free, equitable and quality primary and secondary education. Yet, pre-pandemic analyses found a global ‘learning crisis’: 250 million children were not learning basic literacy and numeracy skills (International Commission on Financing Global Education Opportunity, 2016; UNESCO, 2014). More recently, the World Bank (2019) found that 53 per cent of 10-year-old children in low- and middle-income countries were ‘learning poor’ – they were unable to read an age-appropriate text. Learning poverty is closely linked to income status around the world. In less-developed countries, 90 per cent of children are learning poor compared with 9 per cent in high-income countries (World Bank, 2019).

Countries in East Asia have long been leaders in advancing education, particularly during the Millennium Development Goals era (2000–2016). And yet, at least one in four children – or an estimated 50 million primary school-age children – in the East Asia and Pacific was failing to learn basic foundational skills in school in core subjects, such as language, mathematics and science (UNESCO, 2017b).¹ Another 35 million children, adolescents and youth in the region were not in school and did not have access to learning opportunities (UNICEF, 2019). Additionally, learners are failing to master skills considered necessary for lifelong learning, such as creativity, communication, collaborative teamwork, ethical behaviour, problem-solving and critical thinking.

The region faces the dual challenge of improving learning outcomes for children attending school and of decreasing the exclusion of children not attending school. Traditional education systems are failing those children who do not acquire the necessary skills even when they are in the classroom, which is a factor leading many of them to eventually drop out of school. Some groups of children and youth are more likely to fall behind or be excluded from learning due to circumstances in their environment or family background. If countries are to achieve SDG 4, boys and girls from marginalized communities require special attention due to their geography, language, ethnicity, religion or poverty. Factors linked to disability and gender can compound the difficulties these children face. Young children who experience emergencies, live in conflict situations or are displaced from their home are at risk for psychological or developmental difficulties that will lower their academic achievement (Murphy et al., 2018).

Different countries have varying levels of success in boosting learning among their lowest performers. But the SDG 4 focus on learning outcomes rather than on access to primary school, as per the Millennium Development Goals, poses new challenges for all countries in East Asia and the Pacific. If the region is to improve its position in terms of education results and outcomes, it must refocus policies to better target learning for those children who are falling behind or are excluded from the education system.

¹ See Appendix B for the countries included in the UNICEF East Asia and Pacific region.



1.2 Review objectives and structure

This literature review provides education stakeholders with recent evidence and findings on the most effective strategies for improving learning outcomes among the most vulnerable and marginalized children in the East Asia and Pacific region. Despite the vast world of education research, much is still considered unknown or uncertain regarding what factors – or combination thereof – are responsible for improving learning outcomes in all environments. Access to quality education is important but not necessarily sufficient, especially for the most disadvantaged children.

The literature review had three objectives:

1. Produce a desk review of the learning crisis in the East Asia and Pacific region, with emphasis on primary education and the most marginalized children (chapter 2).
2. Identify, compile and review qualitative and quantitative evidence on learning outcomes in the region around 14 predefined topics of interest (which are not exhaustive but appear to be effective strategies for improving learning outcomes and were chosen through consultations with stakeholders). Emphasis is on the early grades of primary education and the most marginalized children.²
3. Produce an analytical literature review that synthesizes the findings of the reviewed studies on promising approaches to improve learning outcomes within each of the topics of interest (chapter 3).

The 14 topics of interest selected for this work examine areas of interventions in the East Asia and Pacific region for which evidence is not always defined but which appear to be effective strategies for improving learning outcomes. These areas are by no means exhaustive. Instead, they serve to fill a research void and attempt to define interventions or objectives in the region that could possibly have an impact on learning outcomes for children in the early grades of primary education. The focus of the selected education policies, programmes or interventions took place in schools and classrooms, with the exception of the discussion on remedial education interventions.

The 14 topics of interest are grouped into five broad programmatic areas (see Box 1). The scope and definitions are described at the start of each section devoted to one of the five programmatic areas.

² A few modifications were made to the 14 topics of interest in consultation with UNICEF: two areas were removed (school-based nutrition, water, sanitation and hygiene, and health programmes; and programmes that support community participation and monitoring) and two areas were added (teacher management systems and teacher recruitment).

Box 1: Five programmatic areas



Area 1:

Improving early learning opportunities and the transition to primary school

- Transition from preschool to primary school



Area 2:

Improving the quality of the learning environment

- Learner- and teacher-focused ICT education platforms
- Twenty-first-century skills in the primary school years
- High-quality teaching and learning materials
- Curriculum reform
- Engagement with the private sector to improve learning



Area 3:

Targeted learning interventions for children falling behind

- Remedial education interventions for low performers at risk of dropping out of school
- Mother tongue and multilingual education programmes
- Multigrade teaching approaches
- Inclusive education for children with disabilities and other groups of excluded children
- Student incentives



Area 4:

Measuring learning outcomes and applying data to policies and planning

- Tracking learning through stronger assessment systems



Area 5:

Improving teacher quality and performance

- Teacher development systems (pre-service and in-service)
- Teacher management systems



1.3 Research methodology and analytical framework

The objective of the methodology was to remove biases in the selection of evidence from a variety of studies with diverse and systemic differences. This chapter provides a synthesis of the work conducted to produce analytical framework used to develop the related literature review. This section describes the methodology and criteria used for data selection and inclusion in the bibliography. Then the methodological framework to analyse and evaluate the research is briefly described, followed by explanation of the analytical framework applied to answer the questions related to each programmatic area. The discussion then highlights the main limitations of this review (according to the authors).

Methodology

Research documentation for the bibliography and literature review was collected in a systematic manner, one topic of interest at a time, to obtain a selection of relevant and quality work. The Cochrane Handbook for Systematic Reviews of Interventions provided the framework for the development of the methodology to select, evaluate and synthesize the results of the relevant research (Higgins et al., 2020).

The studies – whether qualitative or quantitative – were reviewed using a search, appraisal, synthesis and analysis framework (Grant & Booth, 2009) as follows:

- **Search:** Use the specified criteria (outlined further on) to identify the relevant sources of evidence required using a sensitive search engine with multiple iterations to locate and retrieve extensive possible studies, accompanied by snowballing research methods.
- **Appraisal:** Select studies for their relevance, even if they were not necessarily evaluated using a formal quality assessment. Use a rapid, informal assessment based on the reliability of the source (peer-reviewed journal, organization's reputation, for example).
- **Synthesis:** Present studies in the bibliography in tabular form, using a narrative summary of findings.
- **Analysis:** Align the literature findings – supported by the triangulation of the literature findings – or point out discrepancies to be investigated in further studies.

Following this framework, the authors proceeded in a two-step process. The first step identified an initial selection of documents according to specific criteria to ensure relevancy. The second step required inclusion criteria to ensure quality. These processes are briefly described here.

Criteria for data selection

The first step – search – involved selecting documents emanating from word-targeted searches for each of the 14 topics of interest across several databases and organization websites. The primary sources used were Charles Sturt University Primo search, Science Direct, JSTOR, IDEAS Repec, ResearchGate and Google Scholar. Other sources included websites of influential and reputable international organizations, think tanks and research centres working around various education themes and producing and publishing relevant grey literature (such as the Aga Khan Foundation, the Asian Development Bank, the Association of Southeast Asian Nations, the Asia-Pacific Regional Network for Early Childhood, the Brookings Institution, Plan International, Save the Children, UNESCO, the UNESCO Institute for Statistics, UNICEF, UNICEF Office of Research – Innocenti, the Organisation for Economic Co-operation and Development (OECD) and the World Bank).

Other documents were received directly from UNICEF East Asia and Pacific Regional Office. In addition, some documents were obtained by sifting through the first layers of evidence, finding relevant studies, then going through those documents and looking for additional references, thereby creating a snowball research effect.

Appendix D presents the key words that were used across the literature search. The cross-cutting key words were used in all searches, creating a common research element to the process. Those key words were then crossed with the programmatic area to identify literature for this review.

In addition to the specific search criteria highlighted in Appendix D, other selection criteria included:

- geography: East Asia and Pacific region³
- language: English
- date: 2000 to present⁴
- source types: peer-reviewed journals, grey literature, books and dissertations
- study types: evaluations, impact studies and systemic and thematic reviews.

Appraisal process

The second research step involved appraising the value of the documents by determining selection criteria for inclusion in the bibliography. This required screening the quality of the papers according to criteria identified at the outset of the search process:

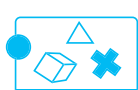
- rigorous analytical methodologies, using high standards of social science research;
- evidence that provides a solid research methodology (qualitative or quantitative), identifies research hypotheses and provides valuable and sustainable conclusions on impact, if any; and
- additional studies with less strict methodologies yet still defined by high-calibre research and argumentation and that contain relevant results for reporting on learning strategies for the most marginalized children in primary education within the 14 topics.

After selected studies were appraised, the data extraction process for the bibliography used a predetermined data extraction template to determine the main criteria for inclusion (Joanna Briggs Institute, 2014). The main data categories extracted were a combination of qualitative and quantitative information:

- Context: descriptive data about the type of study (policy or programme evaluation) or the main data source (qualitative, quantitative, mixed methods)
- Scope: geographical area of study and study context (population subgroups).
- Findings: conclusions made on learning outcomes based on the analysis, with qualitative or quantitative research methodology. Quantitative findings on learning outcomes were included only when they were statistically significant per the confidence limits established in the paper.

³ As specified by the terms of reference. But the researchers expanded the selection to other countries and regions when few studies were found in East Asia and the Pacific.

⁴ In some cases, the date criterion was not used due to the limited number of regional and country-specific reports.



Mixed-methods metasynthesis

The methodological criteria for the selection of literature provided an underlying quality framework for the review. The established Cochrane guidelines further offered methodological guidance for the development of a tool to evaluate and synthesize the results of the relevant research (Higgins et al., 2020). Given the expected range of methodologies that were to be included in the bibliography, the AMSTAR criteria were considered most relevant. This is a measurement tool to assess systematic reviews, to establish their quality and then report the findings on methodological quality, as appropriate.

The mixed-methods metasynthesis methodology was well adapted to the evidence obtained in the context of the bibliography on education interventions in East Asia and Pacific. This work found that quantitative evidence was scarce within the limitations of this study and that evidence was predominantly of a qualitative nature. Like a systematic review, the metasynthesis aims for exhaustive, comprehensive searching and integrates the findings from selected studies using themes or constructs that lie in or across the individual studies.

The selection criteria aimed to locate only studies that would provide understanding of how learning outcomes were affected within the intervention, programme or policy being examined in the literature on basic education. Initial expectations for the search had limited learning outcomes as measured by quantitative evidence, but the geographical limits to the literature review (East Asia and Pacific) led to a broader selection of literature based on qualitative research methods. The framework for mixed-methods meta-analysis was adopted to benefit from the findings in both types of research studies. The literature review process thus involved examining the impact on learning outcomes using qualitative and quantitative means of assessment.

Mixed-methods research has been gaining importance in the field of education because it enables a better understanding of processes, policies, human decisions and other factors that cannot be easily quantified in survey-based data. Mixed-methods studies can broaden the evidence base and provide more inclusive methods of analysis, with a greater link to policy-relevant implications of research findings.

Qualitative evidence

Qualitative research intends to examine a question using interpretative approaches around the subject matter, usually framed with observations, questionnaires and interviews (structured, semi-structured, open). Qualitative research techniques provide structure and rigour to the examination and contribute to an understanding of a particular topic. For example, triangulation – or cross-checking for internal consistency – can accomplish validation at a significant level of confidence (Jick, 1979). Qualitative studies can go beyond determining the effects of an intervention by also measuring their relevance, effectiveness, efficiency and sustainability (OECD, 2010).

An analytical synthesis of a collective body of qualitative work, also known as a qualitative metasynthesis, provides more detailed information or understanding of a specific research question without necessarily arriving at a generalization about the findings. Identifying specific patterns and contexts to further understand the research area contextualizes the metasynthesis (Erwin et al., 2011).

Quantitative evidence

Quantitative assessments provide an association between an experiment or a programme and the impact that they have had on a particular dependent variable. In the context of this study on learning outcomes, the literature review looked to measure improvements with a numeric value. Quantitative assessments on learning outcomes were usually structured around an intervention or student-based assessments on reading, mathematics, science or other competence-based examinations. The exception was in the preschool transition's topic of interest (area 1), where measures of socioemotional development or other early childhood developmental objectives could be used.

The main objective of meta-analysis (based on quantitative evidence) is to aggregate the evidence in such a way as to provide a common and standardized numerical value to the impact. The bibliography reveals far fewer studies using quantitative research than expected, given the wealth of quantitative studies on a global scale.

1.4 Analytical framework

The analytical step using metasynthesis can be considered highly subjective because the bias is reduced through the combination of evidence triangulation and multidisciplinary teams (Lachal et al., 2017). In this mixed-methods metasynthesis, each study was selected by one consultant, although all extracted data were reviewed by another consultant. The literature review separated the evidence by topic of interest, which was then organized into five categories of interventions. In each broad programmatic area, the data analysis was subjected to an independent treatment, extracting themes and findings to generate analytical themes.

The mixed-methods metasynthesis revolved around a clearly formulated set of questions, combining the results of quantitative and qualitative studies with an interpretative lens. The following research questions provided the guiding analytical objectives for each topic of interest. Some of them, however, suffered from lack of quantitative evidence, with clearly established qualifications for the improvements to learning outcomes.

Research questions

As with any research, the literature review began with a typically broad research question that was reduced in scope during the process (Erwin et al., 2011). In the meta-analysis, the research questions were applied to each broad area separately.

The key question for the literature review on learning outcomes:

- What interventions provide evidence of improving learning outcomes in East Asia and the Pacific in the 14 topics and five areas selected for this process?

Within this question, the literature review sought to determine the mechanisms through which learning outcomes had been affected by trying to answer the following questions:

- What types of policy and programme interventions attempted to improve learning outcomes?
- How do the effects vary across the intervention types? Which types of strategies appear more successful than others for improving learning? Less successful?



- From an equity perspective, to what extent do the effects differ among subgroups of participants (defined per category of vulnerability, such as poverty, sex, residence, ethnicity and language)?
- What implications do these findings have for education policy at the national and regional levels? What innovations or small-scale studies merit more attention from researchers and policymakers?
- Are any policy gaps evident in specific geographical areas within East Asia and Pacific?

For many of the intervention areas, the analyses were limited by the quality and availability of evidence within the time constraints of the consultancy. The research limitations and future research possibilities within each programmatic area are explained in the following section.

In this document, each of the five broad areas are treated independently of the others, although impact connections and impact themes are raised across broad areas as relevant.

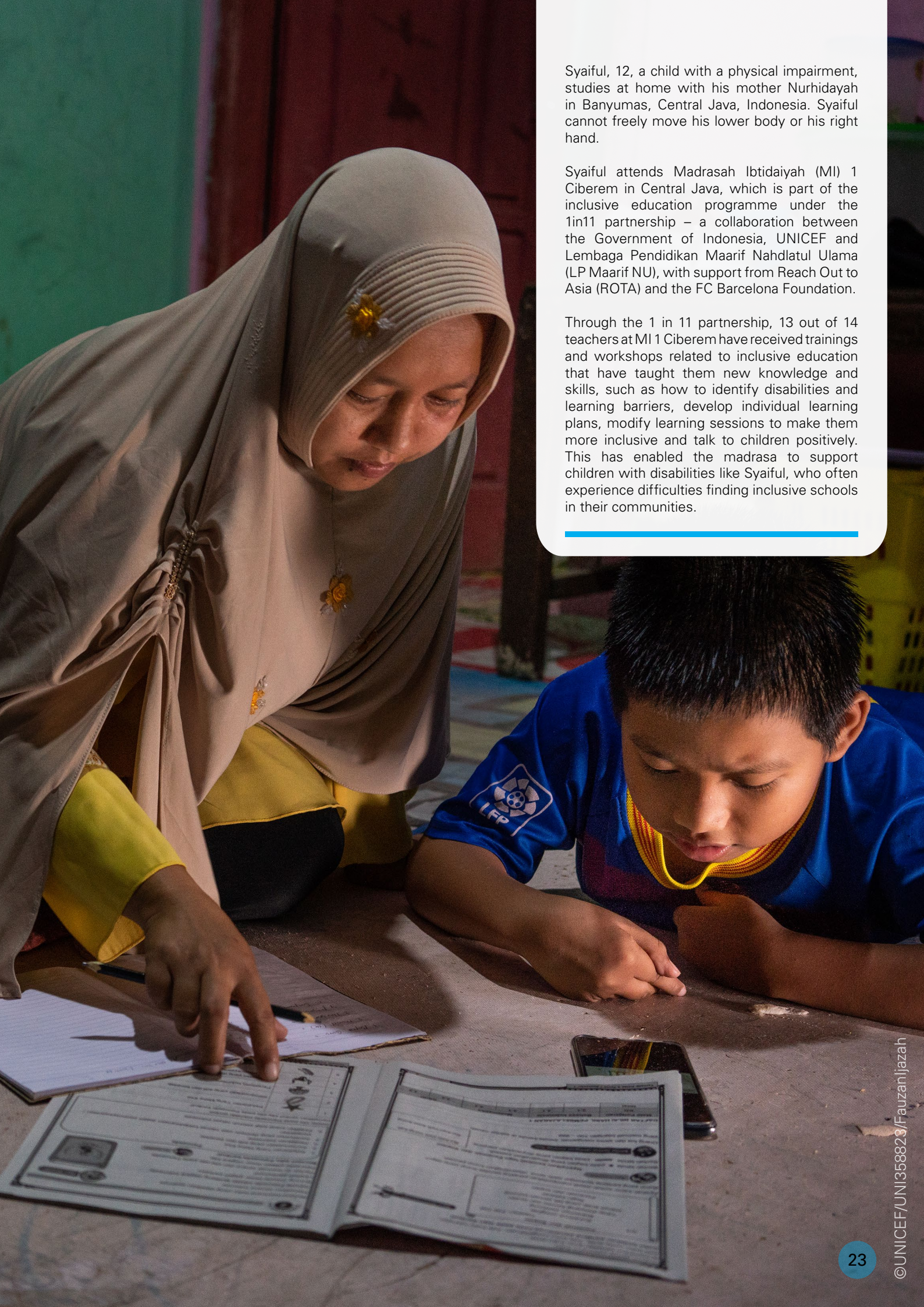
1.5 Limitations

Geographic focus: The geographic parameter of East Asia and the Pacific produced an inherent bias that excluded evidence produced in other regions of the world. Limiting the literature to this region excluded successful interventions from elsewhere. A more comprehensive review would include such evidence, but due to the scope of this research, certain possibilities were restricted. Insofar as possible, this limitation was mitigated by including seminal findings from other regions or from global reports for the relevant programmatic areas. Countries can benefit from cross-country sharing and exchanges and emerging platforms, such as the Practical Education Network and the Centre for Education Innovations (<https://educationinnovations.org/>), to provide meaningful global learning opportunities.

Vulnerable populations: All vulnerable groups could not be covered in the research due to the scope. However, the intent to identify all these vulnerabilities was incorporated in the key word searches (see Appendix D). Some groups who did not appear in the search results included children in emergency situations, refugees and nomadic communities.

Limitations of methodology: The rigorous methodology process used to select studies had its limitations:

- Not all interesting or innovative programmes and interventions were covered. This included studies that could provide interesting lessons, albeit with lower levels of significance or reliability in terms of their findings and conclusions.
- Only studies available in English were selected. Studies available in other languages only were omitted as a result.



Syaiful, 12, a child with a physical impairment, studies at home with his mother Nurhidayah in Banyumas, Central Java, Indonesia. Syaiful cannot freely move his lower body or his right hand.

Syaiful attends Madrasah Ibtidaiyah (MI) 1 Ciberem in Central Java, which is part of the inclusive education programme under the 1in11 partnership – a collaboration between the Government of Indonesia, UNICEF and Lembaga Pendidikan Maarif Nahdlatul Ulama (LP Maarif NU), with support from Reach Out to Asia (ROTA) and the FC Barcelona Foundation.

Through the 1 in 11 partnership, 13 out of 14 teachers at MI 1 Ciberem have received trainings and workshops related to inclusive education that have taught them new knowledge and skills, such as how to identify disabilities and learning barriers, develop individual learning plans, modify learning sessions to make them more inclusive and talk to children positively. This has enabled the madrasa to support children with disabilities like Syaiful, who often experience difficulties finding inclusive schools in their communities.

2

THE LEARNING CRISIS IN EAST ASIA AND PACIFIC

Education policies focused on improving access to school have shown limited impact on educational outcomes. While school attendance is a necessary condition, global experience indicates that it is not sufficient to improve learning for all children (Ganimian & Murnane, 2016; International Commission on Financing Global Education Opportunity, 2016; UNESCO, 2014). SDG 4 makes a strong case for focusing on the quality of learning to improve educational outcomes and maximizing the utility of attending school and its importance for lifelong results. At the end of the Millennium Development Goal period, countries found that the focus on improving access to education indeed had led to significant increases in enrolment. Yet, the quality of learning and teaching struggled to meet the needs of learners and to provide them with the opportunity to develop to their full potential. This learning crisis became the target of new global education goals as specified in SDG 4: to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”.

Between the 1960s and the 1990s, the East Asian economies grew at unprecedented rates and faster than other regions in the world. This ‘East Asian miracle’ in middle- and high-income countries and territories was explained in part by their high level of public investment in education systems, with emphasis on skills acquisition in the fields of engineering, science and technology.⁵ In addition, gender equality in educational opportunities increased the participation of women in the labour force as well as labour force productivity (Hanushek & Woessmann, 2015; Stiglitz, 1996).

By the mid-1990s, the excellent performance of students from these East Asian countries in international math and science assessments demonstrated the high quality of learning achieved in the classrooms. Yet, similarly high investment levels across countries (measured by public investment in education as a share of gross domestic product, or GDP) did not always lead to similar learning outcomes or educational attainment (given that the percentage of GDP also means very different investments in absolute terms, for example, Japan versus the Philippines). “Strong results-driven education systems – which ensure coherence across policies, a clear route from policy to implementation, and effective governance and accountability – are necessary for strong outcomes and lasting change,” the Education Commission (2016) concluded in a research study.

Despite remarkable gains in primary school enrolment in many low- and lower-middle-income countries in the region, low levels of literacy and numeracy remained a development challenge. And exclusions to education based on poverty, location, gender and ethnicity persisted. An estimated 48 million (29 per cent) primary school-age children in East and South-East Asia and 0.8 million children pre-pandemic (21 per cent) in Oceania were not meeting minimum proficiency requirements in reading (UNESCO and UNICEF, 2021). Based on the World Bank’s

⁵ The East Asian miracle countries and territories usually include China, Hong Kong (China), Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore, Taiwan Province of China and Thailand.

learning poverty⁶ indicator data, on average in East Asia and the Pacific, 27 per cent of children faced learning poverty as of 2019 (for countries where data are available) (World Bank, 2019). Similarly, low levels of achievement have been observed for mathematics (UNESCO, 2017b).⁷ According to another estimate, up to 60 million (60 per cent) of students in the East Asia and Pacific region were enrolled in school and performing below proficiency levels (World Bank, 2018a). This has global implications as well. For example, according to a recent World Bank study (Azevedo et al., 2021), five months of school closures due to COVID-19 will result in an immediate loss of 0.6 years of schooling adjusted for quality, bringing the effective learning that a student can achieve down from 7.9 years to 7.3 years.

Many children in East Asian and Pacific countries enter primary school without having spent any time in formal early childhood development environments (see Box 4)⁸ And, in many countries, the most disadvantaged children – the ones who would benefit the most from early childhood interventions – are the least likely to access quality early childhood education. Moreover, the quality of early childhood education services varies greatly by location and type of service.

The learning crisis has taken its toll on students' performance and opportunities in the region, where more than 35 million children, adolescents and youth were not in school (UNICEF, 2019). Of them, 4 million children were of pre-primary school age (one year before primary) and 7 million children were of primary school age (6–11 years old), accounting for nearly one third of all out-of-school children in the region (see Figure 1). For many, their education pathway began at birth with factors leading to their exclusion, such as belonging to a nomadic population, homeless or living in an urban slum, having a disability or speaking a language at home that was not taught in school. For others, especially those in low- and middle-income countries, the education system did not fulfil their teaching mandate (International Commission on Financing Global Education Opportunity, 2016). Children who have faced conflict, displacement or natural disasters – especially before reaching age 5 – were likely to experience psychosocial stress or trauma and miss early learning opportunities (Bouchane, 2018).

Despite their disadvantages, most of these children enrolled at some point in the early years of their life in primary school. However, they remained at high risk of dropping out because of the complex interactions of demand-side factors, including challenges within their family, household and community, and supply-side factors, including challenges in the classroom, school and policy environment.

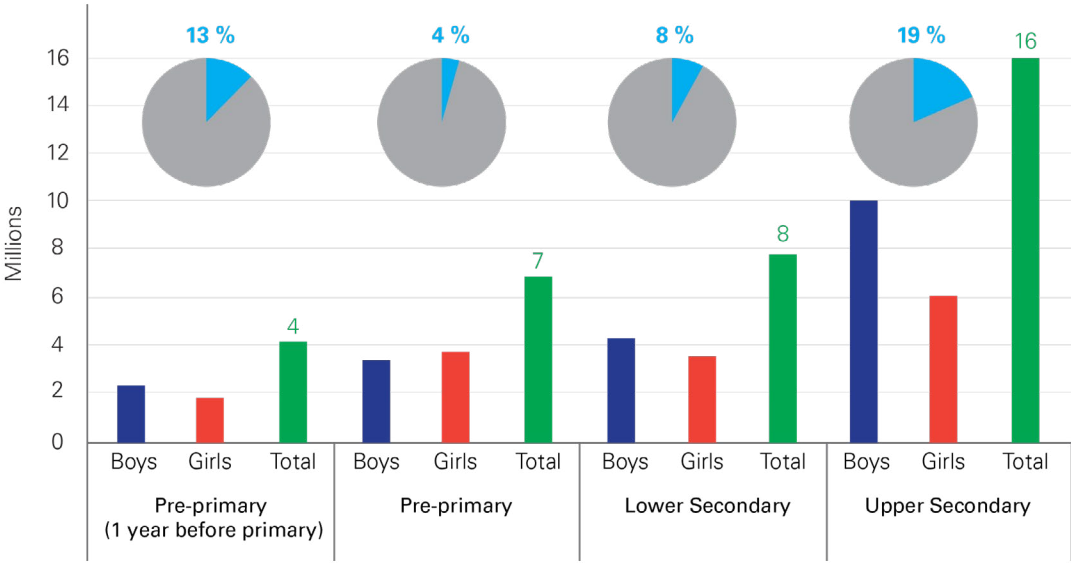
⁶ 'Learning poverty' is a new Concept launched by the World Bank, drawing on new data developed in coordination with the UNESCO Institute for Statistics. Learning poverty means being unable to read and understand a simple text by age 10. This indicator brings together schooling and learning indicators and begins with the share of children who haven't achieved minimum reading proficiency (as measured in schools) and is adjusted by the proportion of children who are out of school (and are assumed not able to read proficiently).

⁷ The number of primary school-age children not achieving minimum proficiency levels in mathematics was 46 million (27 per cent) in Eastern and South-Eastern Asia and 1 million (23 per cent) in Oceania (2017).

⁸ The adjusted net enrolment rate (NERA) one year before the official primary school entry age provides an estimate of time spent in formal learning opportunities. In East Asia and the Pacific, the NERA varies from 33 per cent in Timor-Leste to more than 95 per cent in Brunei Darussalam, Indonesia, Malaysia, Mongolia, Thailand and Viet Nam (UIS, 2019).



Figure 1: Overview of Out-of-School Children and Adolescents in East Asia and Pacific Region (by sex and level)



Source: (UNICEF, 2019).

This chapter summarizes the situation of learning in primary education in the East Asia and Pacific region. Answering the fundamental questions of who is learning (and not learning) and what is being learned (and not learned) are essential to adapting successful corrective and mitigating measures. Section 2.1 examines the findings on learning outcomes as measured by international, regional and national assessments from the past decade. Section 2.2 summarizes the principal findings on factors associated with improved learning outcomes and reports on the results of marginalized populations in learning assessments as much as possible. Section 2.3 examines the level of learning in literacy, numeracy and other subjects measured by learning assessments. Section 2.4 provides an overview of national education sector plans and their link to student assessments and learning outcomes. Section 2.5 highlights new assessment opportunities to improve the measurement of student learning as they are developing in the region and elsewhere.

2.1 General findings from international, regional and national assessments

International and regional assessments of learning outcomes enable the comparison of students’ knowledge across a diverse group of national education systems. Long before the SDG 4 targets were drafted on measuring learning outcomes, these large-scale assessments served as a global monitoring tool for education. They used learning outcomes as a proxy for quality of education systems. Learning assessments have proven to be helpful to education systems beyond monitoring student learning and benchmarking with other countries. Assessments measure students’ capacities with a group of skills, often organized by subject domain (mathematics, language, science). Formats can include oral and written comprehension portions.

In recent years, the number of new assessment initiatives has been growing, especially at the regional level (Kijima & Lipsy, 2017). The diversity of objectives, methodologies and target groups of the international and regional assessments is broad. Box 2 presents an overview of these assessments and more detail is available in Appendix B, including the participating East Asian and Pacific countries.

Box 2: Cross-country assessments in East Asia and the Pacific

Southeast Asia Primary Learning Metrics 2019 (SEA-PLM)

SEA-PLM is a regional initiative to improve the relevance and cultural sensitivity of learning assessments in primary education in the region, with the same high standards as those found in international large-scale assessments. Six countries (Cambodia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines and Viet Nam) participated in the first round of SEA-PLM data collection in 2019, which looked at Grade 5 students' learning in reading, mathematics, writing and global citizenship.

Early Grades Reading Assessment (EGRA)

The EGRA assesses levels of early literacy, which is considered a foundation for later academic success. By identifying reading concerns in the early grades of primary education (usually Grades 1, 2 or 3), the EGRA results can be used to advocate for reducing the gap between readers and non-readers. The tests examine letter identification, reading comprehension (words and passage) and oral reading fluency. At least six East Asian and Pacific countries have conducted EGRA assessments: Cambodia, Papua New Guinea, the Philippines, Timor-Leste, Tonga and Vanuatu. Unlike the other international assessments mentioned here, EGRA is not designed to be comparable across countries or even across languages or scripts within a country.

Programme for the Analysis of Education Systems (PASEC)

Three East Asian and the Pacific countries participated in the 2011/2012 Conference of the Ministers of Education of French-Speaking Countries Programme and the Analysis of Education Systems (PASEC), which measures language and mathematics competencies at the beginning and end of two primary grades (usually Grades 2 and 6). The methodology enables cross-country comparative analyses by measuring skills across standardized levels and examines students' progress over time within the academic year. The 2011/2012 data for Cambodia, the Lao People's Democratic Republic and Viet Nam are not comparable because they are for different grades and with different competency levels.

Pacific Islands Literacy and Numeracy Assessment (PILNA)

The PILNA was designed to assess literacy and numeracy skills with a common questionnaire across participating countries. It scores students by proficiency level (on a scale from 0 to 8). In 2012, more than 10,000 students in Grade 4 and 14,000 students in Grade 6 in 13 countries were tested. The PILNA allows cross-country comparison as well as national disaggregation by gender, geography (urban, rural, remote) and school type (public, private). The PILNA was conducted in 2012, 2015 and 2018. Students excluded from the assessment are enrolled in special schools, remote or isolated schools, small schools or schools offering an international curriculum (EQAP, 2016). The PILNA was conducted in 15 Pacific countries in 2018: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.

Programme for International Student Assessment (PISA)

PISA is a large-scale international assessment conducted among 15-year-olds on reading, science and mathematics. PISA, like most other assessments, is a school-based assessment and thus inherently excludes out-of-school children and largely excludes students with disabilities and children with limited proficiency in the language of the test (UIS, 2018). Indonesia, Malaysia, the Philippines, Taiwan Province of China and Thailand participated in the PISA 2018. Cambodia conducted a PISA for Development, which constitutes an exception because it included out-of-school children.



Progress in International Reading Literacy Study (PIRLS) and Trends in International Mathematics and Science Study (TIMSS)

The PIRLS, which is administered every five years, assesses the reading performance of children in Grade 4. The TIMSS is conducted every four years at Grade 4 and Grade 8 to assess student performance in mathematics. In 2019, 64 countries and territories participated in the Grade 4 assessment. These cross-country learning assessments – like PISA – exclude students with disabilities. It is also possible that the sampling methodology might restrict those schools located in remote regions (Alcott et al., 2018). Malaysia, the Philippines and Taiwan Province of China participated in the TIMSS 2019. The Taiwan Province of China also participated in the PIRLS 2016 and plans to participate in PIRLS 2021.

National learning assessments enable countries to strengthen their education system with better data that inform and help monitor policy developments. For example, in the Lao People's Democratic Republic (PDR), the results of a national assessment led to a review of the primary curriculum across all grades and then became a key strategy in the education sector plan.

The design of a national assessment should be based on the national curriculum and use an efficient and effective sampling process to provide accurate measures across disaggregated groups and time. *Box 3 and Appendix C* summarize the characteristics of a selection of national assessments.

Low- and lower-middle income countries cannot always afford to design and implement a high-quality national learning assessment (UIS, 2018a). Low-quality assessments, such as ones that are not nationally representative or where data are not robust, can be detrimental to producing effective measures or improvements to a national education system (UIS, 2018a).

Targeted reforms are required for the inclusion of marginalized groups in national assessments, with inclusive test accommodations (physical accommodations, inclusive test-taking rules, longer testing times) and separate tests as needed. In 2016, the Philippines approved and published a policy framework on the National Assessment of Student Learning, which has a provision requiring the inclusion of learners with special education needs.

Box 3: National learning assessments in East Asia and the Pacific

National assessments can be conducted across various grades and subjects to monitor student learning. The two main types of assessments conducted in the East Asia and Pacific region are (i) national student assessments that monitor the state of the education system and are linked to curriculum objectives and (ii) high-stakes examinations, which are required for learners to complete a level of education or to transition to the next education level. Appendix C presents the main characteristics of these two types of assessments in a selection of 13 East Asian and Pacific countries. According to latest data collected by the UNESCO Institute for Statistics, 21 countries and territories in the region have early grade reading and mathematics national learning assessments.

National assessments differ widely in their objectives and methodology. Results cannot, by definition, be compared across countries. Two countries in the selection (Malaysia and Myanmar) have high-stakes national examinations that determine learners' placement in the next education level or grade. Two other countries (Thailand and Viet Nam) have primary 'exit' examinations at the end of primary education.

The selection of which primary grades are targeted for testing depends on the challenges in a country. National assessments in early grades can be included if basic or advanced foundation skills in literacy and numeracy are not well-acquired and lead to high rates of repetition or dropouts throughout primary education (see Appendix C).

2.2 Who is struggling to learn in East Asia and Pacific? Findings from learning assessments

Girls tend to perform better than boys.

Generally across the region, girls perform better than boys in all subject areas and grades. For example:

- Results from the PASEC in **Cambodia** showed that girls in Grades 2 and 5 in 2015 tended to perform better than boys across all subject areas (CONFEMEN & MoEYS, 2015).
- Results from the SEA-PLM 2019 showed that, on average, girls were significantly more likely to have higher levels of achievement in both reading and writing literacy. It was a pattern evident in all countries that participated in the initiative. National averages that show that girls outperform boys at Grade 5 in reading and writing literacy are consistent with findings in other comparative large-scale assessments implemented in South-East Asia and the Pacific (UNICEF & SEAMEO, 2020).
- In **Indonesia**, female Grade 2 students had higher scores than boys in 2014 (Stern & Nordstrum, 2014); girls scored significantly higher than boys in the 2016 TIMSS Grade 4 mathematics assessment (Mullis et al., 2016).
- In **Pacific Island countries**, girls outperformed boys in a 2016 literacy assessment of Grades 4 and 6. The boys' performance was two grade years behind the girls. For instance, the Grade 6 boys performed on average at the same level as the Grade 4 girls (EQAP, 2016).



- In **Tonga**, while girls in Grade 3 could read more fluently than boys, according to a 2012 assessment, their level of comprehension was the same, given a similar level of reading fluency (World Bank, 2012b).
- In **Viet Nam**, a 2015 PASEC exam found Grade 5 girls outperformed boys in language, but no gender gap was detected in mathematics. The gap in language scores grew between the second and fifth grades of primary education (CONFEMEN and MOET, 2015).

Even though girls outperform boys in some cases, national averages often mask disparities at the subnational level. Also, multiple sociocultural and economic dimensions act against girls to hamper education rights. For example, migrant girls and girls with disabilities are often at greater risk.

Geography and poverty can be significant barriers to learning.

Factors linked to geography and poverty intersect with the learning outcomes of children. Children from the poorest households who are enrolled in schools may be less likely to attend regularly due to household poverty constraints, such as inability to pay formal and informal school fees or pressure to earn money. Children living in remote areas may also be less likely to attend because of the long distance to travel to school. In many cases, the two factors are compounded and diminish learning opportunities for children. For example:

- SEA-PLM 2019 found that “children from higher socioeconomic backgrounds and those attending schools in wealthier neighbourhoods performed better than children from less advantaged backgrounds”. This pattern was consistent across all three domains. The magnitude of the difference was substantial, ranging between 24 and 26 scale points on average across countries for the three learning domains (UNICEF & SEAMEO, 2020). (See Figure 2).
- The PASEC 2015 results in **Cambodia** revealed that poorer children and children living in rural areas scored consistently lower than wealthier and urban students in all subject areas (CONFEMEN & MoEYS, 2015).
- In **Indonesia**, even when variables such as gender, wealth and remoteness held constant, students from the further eastern regions in 2014 fared much worse in oral reading fluency than in other surveyed regions (Sumatra, Java-Bali and Kalimantan-Sulawesi) (Stern & Nordstrum, 2014).⁹
- In the **Lao PDR**, children in the lowest socioeconomic group in 2015 had significantly lower performance than children from a higher socioeconomic group in Lao language but not in mathematics. The gap persisted throughout primary education, from Grade 2 to Grade 4. No gap was observed between students in rural or urban areas (CONFEMEN & MoEYS, 2015).¹⁰
- In **Viet Nam**, test scores were significantly higher with increased family’s socioeconomic status (Vietnamese language and mathematics) and in urban areas compared with rural areas (for Vietnamese language only) (CONFEMEN and MOET, 2015). And 15-year-old students from the lowest socioeconomic group tended to perform very well in science relative to other countries participating in the PISA 2019 (OECD, 2019).

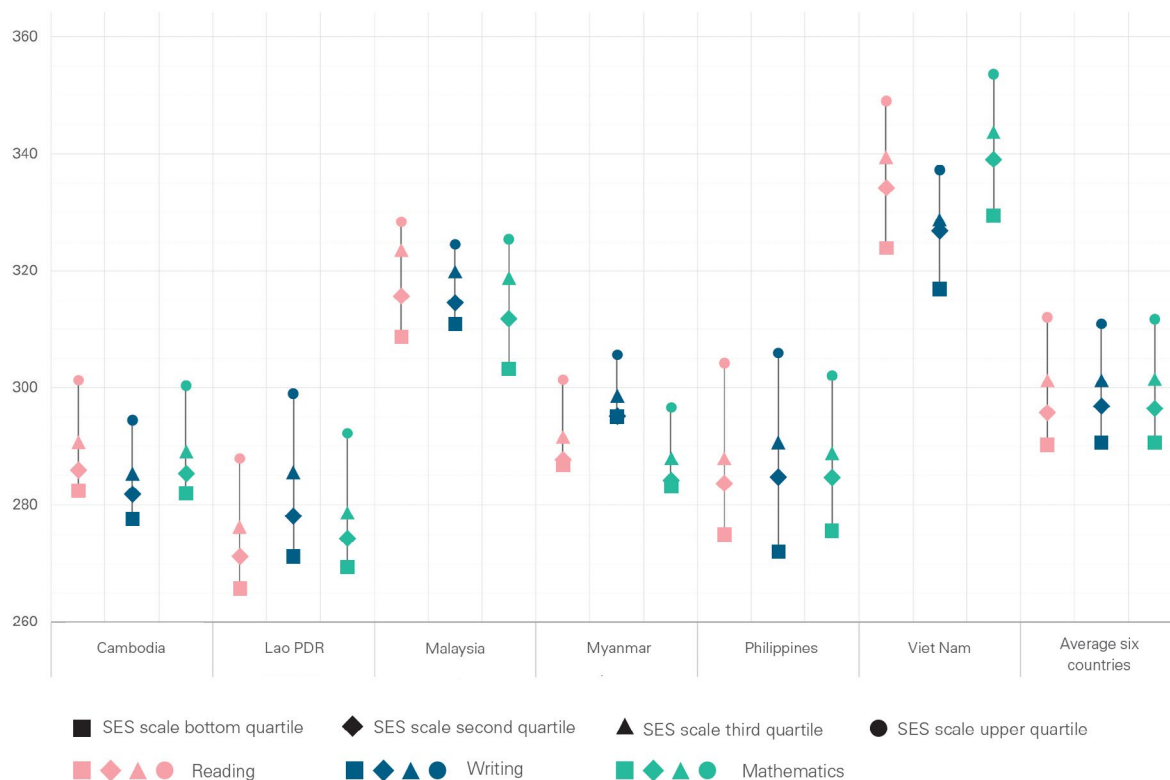
⁹ Consisting of Maluku, East Nusa Tenggara (Nusa Tenggara Timur), West Nusa Tenggara (Nusa Tenggara Barat) and Papua islands (Eastern Region).

¹⁰ Three socioeconomic groups were created based on household possessions, type of housing and transportation means.

Even from the early grades, differences in geography and poverty were factors in creating gaps in learning outcomes. For example:

- The oral reading capacity of Grade 2 **Indonesian** students in 2014 was significantly lower for children in remote schools than in non-remote schools. Grade 2 students who were female, attending private school or from wealthy households had higher scores in oral reading fluency (Stern & Nordstrum, 2014).

Figure 2: Differences in average reading, writing and mathematics scores in the Southeast Asia Primary Learning Metrics 2019, by socioeconomic status



Note: SES=socioeconomic status.

Source: (UNICEF & SEAMEO, 2020).

Preschool attendance is positively associated with learning outcomes.

Children who had attended preschool were more likely to perform better than children who had not attended preschool in the reported surveys. For example:

- Grade 2 **Indonesian** students had greater oral reading fluency if they had attended preschool (Stern & Nordstrum, 2014).
- A longitudinal study in the **Philippines** found that access to preschool continued to make a positive difference to later results in literacy, numeracy and social-emotional development (Monty & Parker, 2019).
- The PISA found that students who had participated in at least one year of pre-primary education had long-lasting benefits, with higher scores in reading, mathematics and science at age 15 (OECD, 2018a). In addition, students from disadvantaged backgrounds (low socioeconomic status) benefited more from the time spent in preschool in **Hong Kong (China), Indonesia** and **Thailand** (OECD, 2014).





Language and ethnicity groups can fare worse than other groups.

Children who belong to a language or ethnicity group in which the language at home differs from the language of instruction in school can fare worse in terms of learning outcomes. Being taught in the mother tongue in the early grades can make a significant, lasting difference in learning outcomes and skill development. For example:

- SEA-PLM 2019 results showed that across five of the six participating countries, children on average in all domains who reported that the language of instruction (also the language of the test) was the same as the language spoken at home outperformed the children who spoke a different language at home (UNICEF & SEAMEO, 2020).
- Grade 2 Indonesian students who spoke the same language at home and at school (regardless of the region) were half as likely to perform poorly in oral reading fluency than the students who spoke a different language at home (Stern & Nordstrum, 2014).

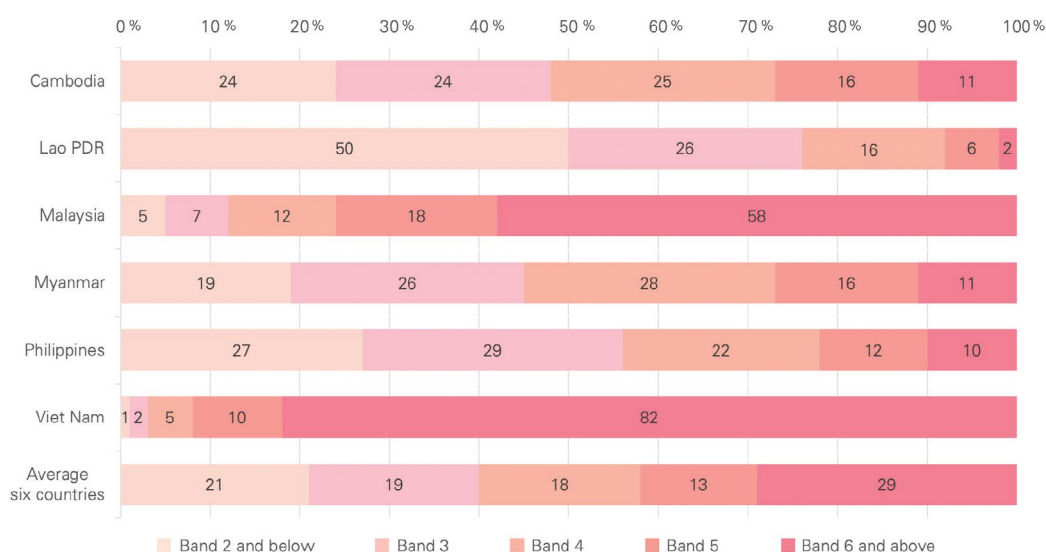
2.3 What is being learned? What is not being learned?

Literacy

A selection of assessment results in the East Asia and Pacific region indicate that early literacy skills can be quite varied across the region and even across assessments. In some countries, decoding skills and early literacy levels can be relatively advanced, but in other countries foundational literacy skills are weak, on average. In most countries, higher-order reading skills (reading comprehension, analytical capacity) tend to be weaker. For example:

- SEA-PLM 2019 results showed a large variation in children’s reading abilities across countries: The number of Grade 5 children struggling to learn foundational skills ranged from 10 per cent in some countries to 80 per cent in others (see Figure 3). In the participating countries, about 2.2 million children in Grade 5 had difficulty to achieve foundational language skills in the early grades (UNICEF & SEAMEO, 2020). The COVID-19 pandemic and related school closures stand to worsen the situation.

Figure 3: Percentage of Grade 5 children in each reading band in the Southeast Asia Primary Learning Metrics 2019, by country



Source: (SEAMEO & UNICEF, 2020)



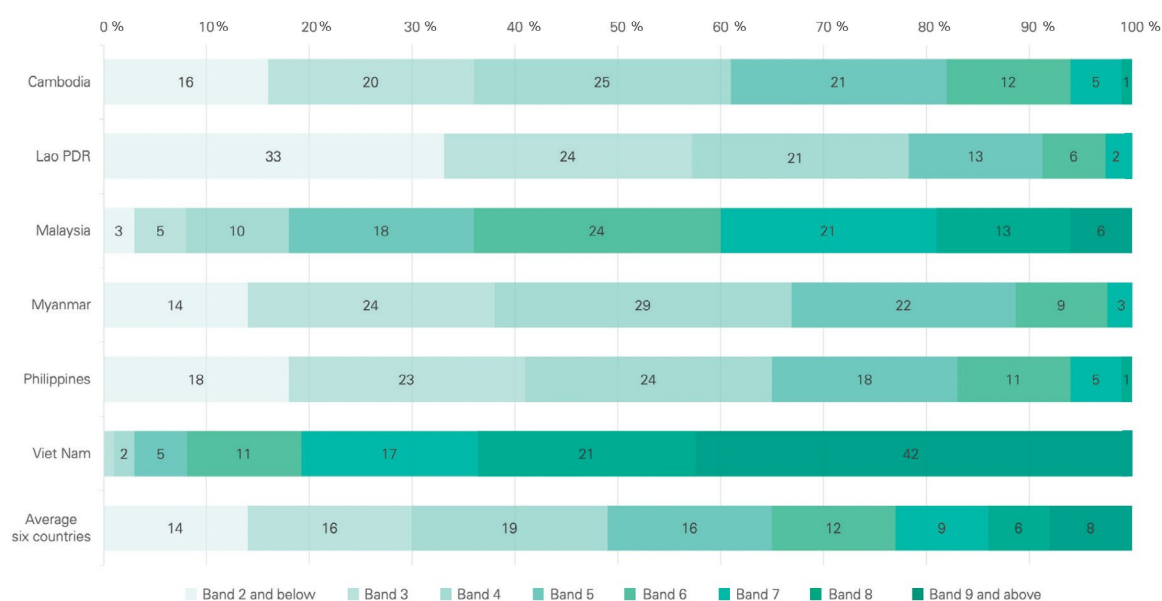
- In **Cambodia**, the Early Grades Reading Assessment results showed that children in Grade 1 had a low reading capacity. On average, students could identify a correct letter only 34 per cent of the time (about one out of three). Only 30 per cent of students were able to read at least one familiar word. Girls performed on average higher than boys (DeStefano et al., 2018).
- The 2015 PASEC assessment in **Cambodia** found that 67 per cent of students acquired the core competencies in Khmer language as expected by the beginning of Grade 3. This included recognizing letters, deciphering and understanding a short sentence or text and performing interpretations and analyses (identifying the main character). Yet, 12 per cent of students were struggling with early basic foundational skills. By the end of Grade 5, however, 15 per cent of students had difficulty with basic language competencies in reading comprehension, listening comprehension and, especially, writing skills (CONFEMEN & MoEYS, 2015).
- In **Indonesia**, Grade 2 students showed relatively high levels of reading capacity, with 73 per cent of students having some reading comprehension. Preschool attendance was associated with higher reading levels. Students who were female, attending private school or from wealthy households had higher scores (Stern & Nordstrum, 2014). The 2012 Progress in International Reading Literacy Study assessment, however, found that students' literacy performance in Indonesia was very low. The national score was the fourth-lowest among 45 countries (Thompson et al., 2012).
- In the **Philippines**, the Early Grades Reading Assessment was conducted in various regions in 2013 and 2014 with multilingual classroom instruction. Although average scores increased between Grades 1 and 2, many children could not read at least one familiar word correctly after two years of schooling. Reading skills were quite low overall, with up to 38 per cent of children in Grade 2 not able to read a single word of a short story in their mother tongue. And 64 per cent of students had achieved partial comprehension in Filipino, while only 18 per cent achieved partial comprehension in English. Girls performed better than boys. Regional differences might be explained by school environments and socioeconomic and demographic factors (RTI International, 2013, 2014).
- In the **Lao PDR**, the 2017 Early Grades Reading Assessment showed that more than 30 per cent of second graders could not read a single word. Among those who could read, 57 per cent did not understand what they had just read (MOES, 2017).
- In **Viet Nam**, the 2015 PASEC exam showed that 91 per cent of fifth grade students had acquired all the skills measured in the language test (Levels 1–3). This test does not measure students' comprehension or ability to write (CONFEMEN and MOET, 2015).
- In **Tonga**, 20 per cent of Grade 3 students were unable to recognize and separate the sounds in a word in 2012. And 10 per cent were unable to recognize the sounds of letters (World Bank, 2012b).
- In **Vanuatu**, more than 30 per cent of Grade 3 students did not have basic fundamental reading skills in 2012. They could not provide a single correct answer in a subtest measuring their ability to identify sounds in letters and to match letters and sounds to create words (World Bank, 2012a).
- In **Pacific Island countries**, the 2016 Literacy and Numeracy Assessment found that less than half (46 per cent) of Grade 4 and Grade 6 students were meeting or exceeding the regional literacy benchmark (EQAP, 2016).

Numeracy

Foundational early numeracy levels are required to build the higher-order numeracy skills expected by the end of primary education (complex problem solving, analytical capacity). For example, findings from the PASEC assessments in Cambodia and the Lao PDR, which are comparable across several grades, showed considerable difficulties in mathematics in the later grades of primary education, indicating that fundamental concepts are not being mastered in the early grades. Examples include:

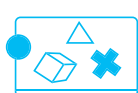
- According to SEA-PLM results, in some countries, a large majority (91 per cent) of Grade 5 children could perform complex mathematical operations and interpret different data sources (see Figure 4). While in other countries, only a few (8 per cent) children were prepared for these tasks (UNICEF & SEAMEO, 2020). In Cambodia, the Lao PDR, Myanmar and the Philippines, for example, modest percentages of Grade 5 children had achieved the mathematical literacy skills expected at the end of primary school, as indicated by the SEA-PLM 2019 mathematical proficiency of Band 6 and above. This implies that in these countries, the majority of Grade 5 children are still working towards mastering fundamental mathematical skills (UNICEF & SEAMEO, 2020).

Figure 4: Percentage of Grade 5 children in each mathematics band in the Southeast Asia Primary Learning Metrics 2019, by country



Source: (SEAMEO & UNICEF, 2020).

- In **Cambodia**, 19 per cent of Grade 5 students faced considerable difficulties in mathematics in 2015. Girls tended to perform better than boys. Poorer children and those living in rural areas scored consistently lower than wealthier and urban students (CONFEMEN & MoEYS, 2015).
- In the **Lao PDR**, 72 per cent of all students mastered all the mathematics skills expected by the end of Grade 2 in 2015. But this performance had fallen by the end of Grade 4, when 40 per cent of students did not reach minimum proficiency in basic mathematical concepts in numeration, geometry and measurement. Only about a third of students (35 per cent) had acquired the basic skills expected at the end of primary education (CONFEMEN and MOES, 2015).



- In **Viet Nam**, the 2015 PASEC exam found that half (50 per cent) of the assessed students had acquired all skills measured in the mathematics test (Level 3) (CONFEMEN and MOET, 2015).
- In **Pacific Island countries**, improvement in numeracy performance between 2012 and 2015 was marked across Grades 4 and 6 as well as within each grade. The share of Grade 4 students who were at or above the expected numeracy proficiency levels increased from 74 per cent to 86 per cent (EQAP, 2016).

Other subjects

The measurement of other critical life skills related to the use of technology, cooperative learning, socioemotional development, deductive reasoning and other non-academic skills traditionally have not been included in international, regional or national assessments. But they are appearing in newer versions, for which data are not yet available (see *Appendix B and Appendix C*). Results in subjects other than language and mathematics are quite rare in the region. The TIMSS and PISA are the two main international measurements of learning outcomes in science for a limited number of countries in the region.

In the PISA scores, **Viet Nam** ranked eighth out of 69 countries in science performance of 15-year-olds, with both boys and girls scoring equally high (OECD, 2018b). Viet Nam also outperformed several high-income countries. Other examples include:

- **Indonesian** fourth grade students demonstrated only a basic knowledge in science, placing them at the fourth-lowest scores among all 46 countries participating in the 2015 TIMSS Study (Provasnik et al., 2016).
- In **Malaysia**, the Year 6 Aptitude Test includes three sections on higher-level language skills: thinking skills; problem-solving and decision-making skills; and interest and inclination.

SEA-PLM is the first assessment in the region to measure comparative attitudes, values and behaviours around global citizenship. The 2019 results show some interesting trends. For example, the results reveal that children have significant interest and concern in environmental issues, such as climate change. They also show that children reported that conflict resolution, such as resolving disagreements and problems in community, are the most valued lessons learned in school.

2.4 Linking learning and learning assessments: General observations from national education sector plans

Education sector plans provide the framework for formulating and operationalizing national education strategies and objectives. Efforts to improve student learning within education sector plans require a strong analytical framework to understand processes that affect student learning and a monitoring framework to provide measurement data for all children. Yet, national capacity for the development, implementation and analysis of national learning assessments is a significant barrier for monitoring learning as well as education sector strengthening in many countries.

A review of 13 education sector plans for East Asian and Pacific countries was included in the literature review to determine if there have been any links established between learning assessments (or other forms of data collection on student learning) and national education

objectives.¹¹ The analysis questioned whether learning assessments influence or provide support for national education objectives and how that link is being established.

In the reviewed education sector plans, assessments of student learnings were usually identified but they were not clearly linked with or intertwined with the overall sector strategy. Learning assessments were usually indicated in a general manner as necessary for monitoring and validating curriculum outcomes (Fiji, Myanmar). The Cambodian 2014–2018 Education Sector Plan linked improved monitoring and assessment as a response to the system’s challenge to improve learning. The Timor-Leste plan for 2011–2030 indicates a clear monitoring strategy for using a performance assessment framework and identifies the development of indicators for monitoring learning outcomes stemming from a new curriculum (in addition to the Early Grades Reading Assessment and the Early Grades Mathematics Assessment).

National education sector plans usually refer to the need to improve learning assessments as part of the strategy to enrich the quality of the education system or learning outcomes (such as Timor-Leste, Vanuatu, Viet Nam). The 2015–2019 Papua New Guinea plan stated the need for a formal measurement system and aimed to create one for Grade 5, which would be extended to other grades.¹² The Myanmar 2016–2021 plan notes that the current school inspection system does not measure minimum standards for learning outcomes, yet the new national curriculum requires monitoring of learning outcomes. The strengthening of student assessment and national examination systems aims to support the education sector plan objectives. And Mongolia’s 2006–2015 education sector plan mentioned classroom-based assessments (confidential appraisal system with performance achievement) to support teaching performance.

Most of the education sector plans that were reviewed lacked indicators or references to equity in their learning assessments. For example, Cambodia’s 2014–2018 education sector plan indicates the implementation of an assessment but does not indicate targets or expected outcome levels on student achievement in Khmer or mathematics. Myanmar’s 2016–2021 education sector plan states the use of national student assessments to improve equity in educational outcomes and student performance, including student background, geography and gender. Timor-Leste’s 2011–2030 education sector plan has a priority programme on social inclusion, but it does not include quantitative measures related to learning outcomes. Measures of equity, which are included, relate to the development of special programmes and student enrolment and participation.

2.5 Measuring student learning

Prior to the COVID-19 pandemic, investment in national and cross-national learning assessments had gained momentum as part of the effort to address the global learning crisis. Now these measures are part of strategies to take account of the learning loss caused by school closures. Measuring progress towards reaching SDG 4 calls for monitoring student achievement at the primary and secondary levels. Targets 4.1.1 and 4.1.2 call for measuring, respectively:

¹¹ Countries selected based on availability in English and date on Planipolis: Cambodia (2014–2018), China (2010–2020), Fiji (2015–2018), Indonesia (2015–2019), Kiribati (2012–2015), Lao PDR (2016–2020), Malaysia (2013–2025), Mongolia (2006–2015), Myanmar (2016–2021), Papua New Guinea (2015–2019), Timor-Leste (2011–2030), Vanuatu (2017–2018 interim), Viet Nam (2003–2015).

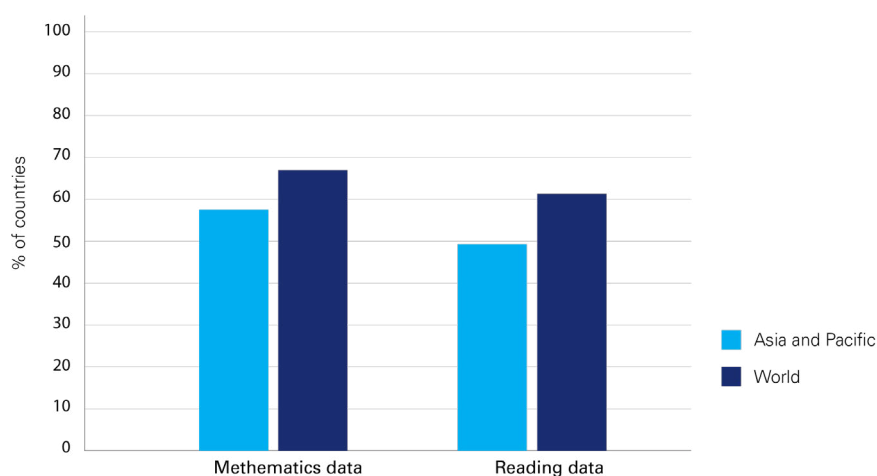
¹² For more information on the use of national examinations to monitor learning outcomes, see Burdett, 2017.



- Proportion of children and young people (a) in Grade 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex.¹³
- Administration of a nationally representative learning assessment (a) in Grade 2 or 3; (b) at the end of primary education; and (c) at the end of lower secondary education.

However, reliable data on learning outcomes remain scarce. In the East Asia and Pacific region, around half of the countries and territories in 2016 were considered to be not well prepared to measure or monitor learning outcomes despite the use of national student assessments (UIS, 2016). With primary education specifically, the region's countries are behind the global average in terms of their readiness to monitor mathematics and reading (see Figure 5). In the region, 58 per cent and 50 per cent of countries considered that they could collect student data on mathematics and reading performance, respectively. The SEA-PLM initiative aims to address the data gap in six countries in the region (see Box 2).

Figure 5: Proportion of countries with sufficient data to monitor children in primary education, by subject



Note: The regional group Asia and Pacific follows the UNESCO definition of countries, which is slightly broader than what UNICEF uses. **Source:** World Bank, 2018b.

Data from national, regional and international learning assessments can be used for a variety of objectives: provide timely feedback on the performance of the overall education system; identify teacher performance or management issues; inform curriculum and teaching material; identify equity gaps in learning opportunities and outcomes; and enhance education management and information systems. Participating in national and international learning assessments can be mutually beneficial for developing education systems. National assessment systems can produce targeted responses to the quality of the curriculum and education system, while international and regional assessments can provide benchmarking of country progress and build national technical capacity (Birdsall et al., 2016). The participation in large-scale assessments has also been considered an important and necessary investment in improving the effectiveness of national education systems (Montoya, 2018). For example, Viet Nam's national assessments served to monitor and evaluate learning following the implementation of targeted education policies (Tobin et al., 2015). Yet, in many low- and middle-income countries, the technical or financial capacity to engage in large-scale learning assessments has not existed (UIS, 2018a; World Bank, 2018b).

¹³ Because there is no universal established benchmark for 'minimum proficiency', the term is defined as those identified in each assessment methodology (UIS, 2018b).

Equity is also a concern in student assessments. International and national assessments often exclude students with disabilities, from language minorities (not language of assessment) or from remote regions (Alcott et al., 2018). The exclusion of certain population groups in learning assessments requires concerted efforts by policymakers to not further compound problems of marginalization. Without data to identify and measure learning challenges specifically linked to exclusion, governments can continue to function per usual within the constraints of the education system framework. Groups that have been regularly excluded from assessment have been the object of specific endeavours and assessments. These include out-of-school children, children of pre-primary school age (not necessarily attending an early learning programme) and children with disabilities.

Several initiatives and approaches in East Asia and Pacific are engaging in the development and improvement of learning assessments at the national and regional levels. For example:

- The Network on Education Quality Monitoring in the Asia–Pacific (NEQMAP) region was created in 2014 to **bring together institutional and government actors** to improve the quality of learning assessment data. With funding and technical support from a variety of international and regional actors, including the Global Partnership for Education, NEQMAP has been strengthening technical capacity through training workshops, seminars and conferences and providing support for assessment development. NEQMAP has built up its research and analytical work to further enhance knowledge exchange and capacity development.
- The Southeast Asia Primary Learning Metrics is a regional initiative to improve the **relevance and cultural sensitivity of learning assessments** in primary education with the same high standards found in international large-scale assessments.
- The Global Partnership for Education recently selected Viet Nam among three pilot countries to launch a **new participatory approach to improving national assessment systems**. The Analysis of National Learning Assessment Systems in Viet Nam will include civil society and decentralized authorities to diagnose the challenges to an inclusive and robust assessment system.
- **Reaching out-of-school children** can be a limiting factor in understanding national literacy and numeracy when administering only school-based assessments. Household-based assessments of child developmental levels, literacy or numeracy skills can be complementary tools that provide an equitable measure of learning. UNICEF’s Multiple Indicator Cluster Survey 6 module on foundational learning skills, which includes several countries in the region (Democratic Republic of Korea, Kiribati and Mongolia), responds to that challenge by including a foundational learning skills module in its household survey (UNICEF, 2020a).
- The implementation and evaluation of education programmes across various countries can serve as a means to target the assessment of specific populations. For example, Save the Children’s International Development and Early Learning Assessment (IDELA) has been used in 35 countries to **assess young children’s development and learning** (early numeracy, early literacy, social–emotional development and motor skills). IDELA includes a direct assessment for children aged 3.5 to 5 years and a parent and caregiver questionnaire, which can be adapted and used in various national and cultural contexts. IDELA is also considered a data source for SDG target 4.2.1 to identify the number of children younger than 5 years who are developmentally on track (UIS, 2018b).





3

WHAT WORKS TO IMPROVE FOUNDATIONAL LITERACY AND NUMERACY? SUMMARY OF EVIDENCE FROM EAST ASIA AND PACIFIC



3.1 Improving early learning and the transition to primary school (area 1)

Early childhood education perhaps has the strongest evidence demonstrating its positive contribution to foundational literacy and numeracy and general primary school learning outcomes. Research from around the world shows that early childhood education at home or in quality centre-based environments have a pivotal role in children's holistic development. It gives children a greater chance to succeed in primary school and throughout the critical early childhood period.¹⁴ Providing young children with access to nurturing, stimulating and secure environments lays the foundation for their healthy cognitive, language, socioemotional and physical development. The research also shows that quality early childhood education programmes benefit disadvantaged children's learning the most.

A large body of evidence from countries of all income levels in East Asia and Pacific also speaks of positive, long-lasting benefits for children who participate in quality early childhood development programmes. From a learning perspective, children are better prepared for school, stay in school longer and perform better academically (for example, see (Engle et al., 2011; Naudeau et al., 2012; OECD, 2018a)). The SEA-PLM data indicate that, in all countries, children who had attended at least one year of preschool education consistently performed better than children who had not. This positive influence of preparatory years continues to show benefits for children's outcomes at least five years into their primary education.

Evidence from other countries and regions shows the durability of these results well into primary and higher education levels (Heckman, 2008; Neuman & Devercelli, 2013; Sayre et al., 2015). Countries that have an interest in increasing learning outcomes throughout the education cycle can harness the benefits of improving access to quality early years learning programmes for all children, especially those most disadvantaged.

A successful transition from home to school is critical to children's future school performance. Early childhood education programmes help children make that transition by creating a bridge (National Research Council, 2000). The experience of group routines and socialization in early childhood education settings provides a solid socioemotional foundation for children to enter primary school (O'Kane & Hayes, 2010). However, a successful transition also relies on characteristics within the primary school learning environment (OECD, 2017). Significant

¹⁴ Early childhood is the period from birth to 8 years. Early childhood development refers to all aspects related to the care and development of children. The term indicates a holistic approach of young children's nurturing care, including health, nutrition, security and safety (protection), responsive caregiving and opportunities for early learning (UNICEF et al., 2018). Other similar terminologies used by multi-state organizations are 'early childhood care and development', 'early childhood education and care' and 'early childhood care and education'. Early childhood education refers to a subset of activities that have education and learning as principal components.

pedagogical differences between early childhood education and primary school settings can create stressful environments in which children are less amenable to learning (Carr et al., 2010).

This section looks at different early childhood education programme interventions (centre-based, home-based and community-based) within the East Asia and Pacific region that were evaluated for their impact on improving learning for primary school children. In the region, most early childhood education interventions aim at improving access to quality early childhood education, in some cases for the most marginalized children. Their eventual aim is to improve learning outcomes in primary school. Specifically, the majority of programmes that were reviewed aimed to:

- increase access to different types of early childhood education learning programmes (Bouguen et al., 2013, 2018; Brinkman et al., 2015, 2017; Hasan et al., 2013; Jung & Hasan, 2014; Macdonald et al., 2017)
- improve the preparation of children through targeted catch-up programmes by focusing primarily on specific areas of skills acquisition, including verbal, mathematics and reasoning skills (Aboud et al., 2016; Kim, 2017); and
- improve early childhood education teacher practices and/or change pedagogies to better deliver early childhood education (Ahtola et al., 2011; Emfinger, 2012; Fabian & Dunlop, 2007; Macdonald et al., 2017, 2017; Nonoyama-Tarumi & Bredenberg, 2009; Peters, 2010).

Another smaller group of early childhood education interventions in the region aimed to facilitate or create smooth and successful transitions to primary school, with the overarching goal of encouraging learning outcomes in primary school. This type of intervention was less common and was often implemented with interventions for expanding access.

Within this category, interventions aimed at improving teacher practices to support and ease children's transition to primary school (Ahtola et al., 2011; Emfinger, 2012; Fabian & Dunlop, 2007; Macdonald et al., 2017; Nonoyama-Tarumi & Bredenberg, 2009; Peters, 2010; UNICEF, 2012b; Vogler et al., 2008).

Box 4:

Scope of area 1: Improving early learning opportunities and transitions to primary school

The International Standard Classification of Education (ISCED) is a cross-country reference classification for categorizing national education programmes and related qualifications by education levels and fields. ISCED Level 0 refers to early childhood education and is subclassified into two categories, depending on a child's age and the level of complexity of the educational content: early childhood educational development programmes (ISCED 010) and pre-primary education programmes (ISCED 020). Transitions refers to the set of policies and programmes that accompany children from ISCED 0 to primary school (ISCED 1). The scope of transitions is limited to centre-based early childhood development interventions that provide care and education for children from birth to entrance into compulsory primary school.

The scope of the research included in this programmatic area is limited to this definition.

What works to improve learning?

The global and regional evidence is clear on the effectiveness of early childhood education investment in improving learning. This section explores the evidence to assess which type of investment provides the most promise. Several key pieces of evidence emerged from the review of literature on early childhood education interventions. While these findings are not necessarily generalizable to all countries in the region, they provide important lessons on how to improve learning that are even more important now in the context of efforts to recover the learning lost due to the COVID-19-related school closures.

Increasing access to early learning programmes for the most disadvantaged children

Research from the region shows that, in general, increasing the amount of time children spend in early childhood education services increases learning outcomes in primary school only when the services are of a minimum quality. This is especially true for children from the most disadvantaged communities. For example, the Early Childhood Education and Development Project in Indonesia (see Box 5) found that, for poor children living in rural areas, both preschool quality and the amount of class time spent in early childhood programmes are significant positive predictors of children's developmental outcomes, which in turn facilitate transitions to primary school (Brinkman et al., 2015, 2017).

Evidence also supports ensuring free access to early childhood education services for children from the most disadvantaged communities. Although the impact of fees on preschool attendance was not within the scope of this work, one programme noted that this policy can lead to lower positive impact on learning outcomes for the most disadvantaged children (Brinkman et al., 2015).

The expansion of community-based playgroups in low-income districts in Indonesia for children aged 3–5 years had a significantly stronger positive impact on language and cognitive development among the most disadvantaged children (children from poorer families, girls and children who were not enrolled at the baseline time). The same programme in Indonesia was found to reduce achievement gaps between children from poor and rich families within the same targeted villages (Jung & Hasan, 2014). Training of early childhood development teachers, rather than infrastructure development, was the focus of this programme (Brinkman et al., 2015; Hasan et al., 2013).

Evidence from the region also shows that poor quality and poorly implemented programmes can negatively impact disadvantaged children's learning the most (Isaacs et al., 2008; Kim, 2017; Melhuish et al., 2015; OECD, 2017). This also holds true for programmes targeting smooth transitions (Bouguen et al., 2018). Thus, from an equity perspective, the design quality and implementation of early childhood education interventions are absolutely critical to nurturing positive impact on learning for the most disadvantaged children.

For example, programmes and policies that improve access to early childhood development programmes, particularly through increased infrastructure, without paying attention to the factors contributing to children's preparedness for primary school may impact children's learning in a way that is small, insignificant or even negative. In Cambodia, an early childhood development intervention resulted in unintended negative impacts because of poor-quality implementation. The programme constructed preschool classrooms in rural disadvantaged areas of Cambodia with the aim of increasing cognitive development among children and primary school performance. When the preschools were constructed, children in the community enrolled in preschool rather than maintain the status quo, which was to enrol underage children in primary school. Given the newness of the preschools, the quality of instruction



and the overall learning environment were inferior to the primary Grade 1 class. The cohort that had the highest programme exposure (attending preschool) had negative and statistically significant (-0.19 SD) cognitive results (communication and problem solving). In addition, the programme led to an enforcement of the school starting-age policy, at 6 years, for enrolling in preschool. This meant that in the control group, the children who would have enrolled in primary school at age 5 stayed at home because of the stricter enforcement of the law, which led to negative impacts for the control group as well (Bouguen et al., 2018). Children of poorer and less educated parents fared even worse than the average. This suggests that the impact of preschool programmes can be highly context-specific and determined in large part by the – sometimes unexpected – behavioural responses to an intervention (Bouguen et al., 2018).

Improving school readiness through targeted catch-up programmes

Tailored pre-primary school readiness and catch-up programmes that target specific skill gaps have a positive impact on learning outcomes and can support learners to acquire foundational reading skills and other socioemotional skills needed for primary school. This is an important lesson for efforts to support learning recovery post-COVID-19. In the Republic of Korea, a vocabulary-building intervention targeting children from low-income families in two districts showed that such support to children to learn age-appropriate words had a significant positive impact on their vocabulary and school readiness (see Box 5). A study of the programme showed that children in the treatment group demonstrated receptive knowledge of 10 additional vocabulary items at the follow-up assessment (compared with the baseline). The effect on productive vocabulary knowledge was even greater, with an increase of about 24 words, whereas children in the control group demonstrated receptive knowledge of about six additional vocabulary items and productive knowledge of fewer than two items.

Box 5: Examples of successful early childhood education interventions in the region

Early Childhood Education and Development Project in Indonesia. This project provided selected communities with the services of a community facilitator to raise awareness on the importance of children's development. In addition, communities received block grants (US\$18,000 over three years) to establish or strengthen preschool services of their choosing to cater to children between the ages of 0 and 6 years. The overwhelming majority of communities chose to establish playgroups – group programmes typically intended for children aged 3–6. Most communities (79 per cent) established new services. The project also included 200 hours of training for individuals from the community who were selected to be teachers. The project was implemented in 3,000 villages in 50 districts across Indonesia (Brinkman et al., 2017).

Academic Vocabulary Learning Intervention in Seoul, Republic of Korea. To help young children from low-income families adapt to first grade, this study initially identified the general academic vocabulary needed in kindergarten and first grade classrooms and then selected the high-frequency words. Given that most young children acquire new vocabulary through shared storybook reading (Dickinson & Smith, 1994; Hargrave & Sénéchal, 2000), the present study implemented a storybook-based vocabulary intervention for young low-income children and analysed the learning outcomes. A treatment group (25 children) had the opportunity to learn the targeted academic vocabulary while reading storybooks and participating in follow-up activities, while the control group (24 children) participated in regular shared storybook reading sessions. A pre-test and post-test were administered to the children in the treatment and control groups (no indication of how these were assigned). This intervention targeted 5-year-old children from low-income families in two districts of Seoul (n=49). The study found that the experimental group showed significantly more growth than the control group in knowledge of the targeted academic vocabulary (Kim, 2017).

These results confirm that tailored programmes can support learners to acquire academic vocabulary (Kim, 2017). And in turn, they help bridge the gap in productive and receptive vocabulary knowledge (using and understanding words). Another promising programme is the Kindergarten Catch-Up Education Program in the Philippines (Llego, 2014). It is an educational intervention for children aged 5 years and older who do not have access to school or a day-care centre or those who live under difficult circumstances, such as illness, displacement due to armed conflict, resettlement, disasters, extreme poverty, child abuse, such as domestic violence, and who are unable to finish the General Kindergarten Education Program.

These findings also hold true when programmes are delivered at the start of Grade 1.

Evidence from Cambodia shows that training primary school teachers to implement a school-readiness skills programme during the first two months of first grade can be very successful. The programme included a range of components, such as the development of special curricular documentation, a teacher training programme, regular monitoring mechanisms to support teachers and the upgrading of classroom and student assessments for monitoring and reporting purposes. Children who participated in this programme performed significantly better than children who did not receive the intervention, in both school readiness skills (basic language skills, the concepts of number, time and space, hygiene and working in groups) and achievement of formal curriculum (terminal achievement test) in primary school.¹⁵ Although the effect size was small (0.25 standard deviation, or SD), the learning gains were maintained one year after the programme (Nonoyama-Tarumi & Bredenberg, 2009).

¹⁵ See programmatic area 2 for more detail on the intervention.



Play-based early childhood education curricula can provide equally positive impacts on learning as those that take a formal academic approach. Different curricular emphases in early childhood education programmes can provide positive impacts in learning. An intervention in Tonga, for instance, compared two complementary programmes to enhance literacy outcomes: one focused on community play-based activities for children of preschool age and the other on improving reading instruction in the early grades of primary school. The researchers concluded that positive impacts were found in both programmes and were of similar value in all statistically significant literacy-related domains (Macdonald et al., 2017). In this example, the play-based activity intervention was as cost-effective as the reading instruction intervention (Macdonald et al., 2017). Anji Play (Xueqin, 2020) is another practice. Used in 130 public kindergartens in Anji County, China, it is based on comprehensive early childhood curriculum and philosophy, with broad applicability to all learning settings. Anji Play promotes understanding and creating the conditions of love, risk, joy, engagement and reflection.

Improving early childhood education teacher practices

The quality of early childhood education classroom environments, teacher training and teacher characteristics are important factors linked to improvement in learning outcomes. In the Indonesia programme specifically, classroom quality showed an impact on learning outcomes. Classroom quality was measured using the Early Childhood Environment Rating Scale-Revised,¹⁶ which includes teacher characteristics and structural characteristics of preschool services, such as their size and amount of class time. A 1 SD increase in classroom quality related to a 0.071 to 0.082 SD increase in children's developmental outcomes (as measured by the Early Development Instrument). In short, children who attend quality early childhood programmes were more 'school ready' (Brinkman et al., 2015, 2017). In addition to quality, the curriculum, management and administration and support of parents and community were equally important success factors for early childhood education programmes.

Teacher preparation for early grades is critical for attaining increases in learning outcomes. However, teacher quality may be a more important factor than teaching experience. The impact of teachers and their characteristics on student learning outcomes and preparedness for primary education was less broadly studied in the research evidence found across the region. In the Indonesia preschool programme, increasing teachers' education level was a significant predictor of children's social competence, communication and general knowledge (ranging from 0.184 to 0.264 SD). Teachers with more experience (as measured by mean years of teaching) had a small but negative effect on children's physical health, well-being, communication and general knowledge. Receiving teacher training had no effect, although a follow-up assessment suggested that teacher training was inconsistently implemented, thereby questioning the result (Brinkman et al., 2015, 2017). These findings on teacher characteristics suggest that hiring policies based on recruiting teachers with more experience and training will be insufficient to improve children's learning. Instead, the quality of professional education programmes and more in-depth training can contribute to positive child development impacts (Brinkman et al., 2015, 2017). Also, mentoring and coaching are critical to the continuous learning of teachers and child development workers to hone their competencies.

The quality of the early childhood education programme implementation is an important factor for enabling a change in learning outcomes. Poor implementation can lead to null or negative impact. For example, a set of three early childhood development programmes in Cambodia, including a home-based component, community preschools and

¹⁶ A comprehensive instrument of preschool quality based on direct observation of classrooms in session.

formal early childhood development classrooms, did not have any short-term positive impacts on learning outcomes. Various implementation difficulties, low take-up and the limited time that children participated in the programme before the evaluation were contributing factors to these results (Bouguen et al., 2013).

Box 6: What is quality early childhood education?

Quality early childhood education interventions are defined by three interlinked dimensions: ready children, ready schools and ready families. School readiness is embedded within holistic development because, for example, health and learning are strongly correlated. Key aspects of early childhood development programmes that are essential for school readiness: location and design; family, school and community; teachers and school managers; and monitoring and evaluation of school readiness. For example, supportive parenting and stimulating home environments are among the strongest predictors of school performance during primary school and beyond. And primary school teachers with early childhood training are more effective in the early grades than teachers who lack such training (UNICEF, 2012b).

Easing children's transition to primary school

Evidence from the region and internationally shows that supporting positive transitions for children from preschool to school, particularly for children from low-income groups, can reduce the equity and learning gaps in primary school. Transition measures, such as exposing children in early learning settings to a variety of experiences that they would experience in primary school (whole class, small groups, individual work) can remove the challenges (Fabian and Dunlop, 2006). The converse is also true. Research found that low-quality transitions – where no pedagogical or professional links were established between early childhood education and primary schools – often affected children from vulnerable and disadvantaged backgrounds more than their better-off peers (Isaacs et al., 2008; Kim, 2017; Melhuish et al., 2015; OECD, 2017).

Supporting smooth transitions from early childhood education programmes to primary school may be especially important for children from the most marginalized groups. A review of recent research on children starting school highlighted that any characteristic of a child and family that contributes to this transition will always depend on the nature of the context the child enters. Almost any child, and particularly disadvantaged children, are at risk of making a poor or less successful transition if their individual characteristics are incompatible with features of the environment they encounter. For example, children who do not share the language or dominant culture of the school may be particularly vulnerable if the school contexts are not tailored to support them (Peters, 2010).

Pedagogical links and academic preparation are part of a successful transition. For example, the vocabulary intervention in the Republic of Korea helped create a more fluid transition to first grade for children from low-income families by increasing their vocabulary to what was needed in kindergarten and Grade 1 (Kim, 2017). Results from Finland show that the best predictors of children's skills are cooperation between teachers over the curriculum and passing on written information about children between preschool and elementary school. Yet, these were also the least common practices (Ahtola et al., 2011).

The socioemotional aspects of a child's transition to primary school are also critical to their success and learning, particularly for disadvantaged children. Successful transitions depend on



the nature of the relationships between all involved, such as creating an inclusive environment. This may be even more important in the context of the COVID-19 pandemic, during which many disadvantaged families have suffered extreme economic and socioemotional stress. For example, connecting with children's fundamental knowledge, implementing culturally responsive teaching and making links between early childhood education and primary school are some of the things schools and teachers can do to facilitate positive transitions (Peters, 2010). (See Box 7 for more effective strategies.) The reason for poor transitions to primary school for disadvantaged children may include: low teacher expectations, lack of recognition or connection with the fund of knowledge children bring and problems with the home-school relationship. Children who do not share the language or dominant culture of the school may be particularly vulnerable if the school contexts are not tailored to support them (Peters, 2010).

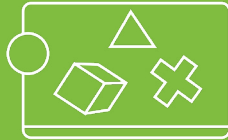
Box 7: Supporting transition to primary school for the most disadvantaged children

Research shows that no matter how academically capable a child is, unhappiness over lack of friends, problems in the playground or bathrooms, a poor relationship with the teacher, inappropriate challenges, low expectations and so on will have negative consequences for their learning. For children, their friendships, peer relationships and the relationship with their teacher appear central. In New Zealand, for example, creating culturally inclusive primary school classrooms was found to be a strong factor in fostering higher achievement among Māori children. The personal qualities of teachers had a vital impact on their relationships with children and families and in their willingness to be proactive in exploring barriers to successful transitions.

The literature offers important strategies for helping to ensure positive transition, including:

- connecting with the knowledge that children bring to school from home;
- culturally responsive teaching;
- appropriate assessment practices that recognize the situated nature of learning and the cultural construction of assessment practices;
- making links between children's learning in early childhood education and school;
- fostering children's relationships and friendships and creating contexts that reduce the negative consequences of not having friends;
- considering children's whole experience of school, including lunchtimes and using the bathrooms;
- providing opportunities for play that enables children to explore experiences, develop language and foster understanding and meaning;
- understanding the impact of rules and the way these can support belonging but can also constrain children's behaviour and create anxiety;
- providing information and familiarization activities for children and families and learning about children and their families; and
- developing home-school partnerships.

Source: Peters, 2010



AREA 1:

IMPROVING EARLY LEARNING OPPORTUNITIES AND THE TRANSITION TO PRIMARY SCHOOL

SUMMARY OF KEY MESSAGES

- In general, increasing the amount of time children spend in early childhood education services increases foundational learning outcomes in primary school ONLY when the services are of a minimum quality. This is especially true for children from the most disadvantaged communities.
- The amount of class time spent in quality early childhood programmes matters; more time leads to more learning.
- Tailored school readiness and catch-up programmes in pre-primary years or in Grade 1 of primary school that target specific skill gaps have a positive impact on learning outcomes and can support learners to acquire foundational literacy and numeracy skills needed for primary school.
- Play-based early childhood education curricula can provide EQUALLY positive impacts on learning as academically focused programmes.
- Teacher preparation is critical for attaining increases in learning outcomes for the early years. However, teacher quality may be a more important factor than teaching experience. Policymakers should not solely focus on hiring teachers with more experience and training but rather address the quality of professional education programmes.
- The quality of the early childhood education programme implementation is an important factor for enabling a change in learning outcomes. Without quality, early childhood education interventions can lead to null impact or negative impact.
- No matter how academically capable a child is, unhappiness can jeopardize their success. Children's comfort and happiness at the start of primary school is a good predictor of their learning outcomes. For children from disadvantaged communities, creating a culturally inclusive environment at the start of primary school can lead to successful transitions.
- Programmes and policies that improve access to early childhood development programmes, particularly through increased infrastructure, need to pay better attention to factors that contribute to child preparedness for primary school.
- Increasing construction of preschools without sufficient attention to environment, curriculum and teacher skills does not impact learning positively.







3.2 Improving the quality of the learning environment (area 2)

The quality of children’s primary school learning environment has an important role in supporting learning. Children’s learning in the early grades of primary school is affected by a variety of school and classroom-based inputs, including teachers, infrastructure, curriculum, teaching learning materials and access to information and communication technologies (ICT). In theory, high-quality inputs should lead to improved learning outcomes. ICT and digital classroom environments are increasingly seen as critical quality inputs to learning environments.

The COVID-19 pandemic, which forced millions of children into distance learning programmes, drastically and abruptly changed children’s learning environments. While evidence on the impact of these changes was not available at the time of the study, this is an important area for future research. The urgent rush to establish digital learning platforms during the COVID-19 school closures called much attention to the digital divide in the region on the use of ICT in learning environments. Although data are not available specific to the East Asia and Pacific region, according to a recent global study (UNICEF, 2020c), at least 463 million (31 per cent) schoolchildren could not be reached by digital and broadcast remote learning programmes adopted to counter school closures. The situation was worse for children from rural and poor households. Globally, three out of four students could not be reached by remote learning opportunities.

Prior to the remote learning necessitated by the COVID-19 pandemic, countries in East Asia and the Pacific were at varying stages of using ICT in the classroom. The majority of them did not have any policy on ICT in education prior to the pandemic. Children across the Asia–Pacific region vary in their level of ICT literacy due to the differences between economic development levels and the resources dedicated to ICT in formal education. While ICT is ubiquitous in high-income countries, the integration and use of ICT in education – especially more advanced forms of ICT – are often limited in many developing countries. Consequently, children and youth in developing countries tend to “learn more about how to use ICT informally outside of the school system than in the classroom” (UNESCO, 2016b) (see Box 13).

Integration of ICT is only one component of improving the learning environment. For decades, the global education discourse around improving learning has centred on improving the quality of educational inputs. Governments across East Asia and the Pacific have invested heavily to improve learning environments by upgrading the quality of inputs. The types of policy reforms and interventions across the region include:

- **reforms in national curricula largely aiming to better align curricula content with twenty-first-century skills** (Aristovnik, 2012; Lin et al., 2014; Lingam et al., 2014; Parandekar et al., 2017; Sentance & Csizmadia, 2017);
- development of **new teaching and learning materials**, often introduced with other programme components, such as teacher training, and the use of ICT education platforms included in schools and remedial programmes (Abeberese et al., 2011; Baron & Harrari, 2005; Busingye & Najjuma, 2015; Elwood & Maclean, 2009; Ganapathi, 2018; Lu et al., 2016; Myriad Research, 2017; Nonoyama-Tarumi & Bredenberg, 2009);
- **integration of ICT into classroom environments;** and
- **improving school** infrastructure.

This section examines the impact on children’s foundational learning of programmes in East Asia and Pacific that aimed to improve the quality of environmental inputs (see Box 8). Teachers, who are perhaps the most critical input to the learning environment, are discussed in area 5.

Box 8: Scope of area 2: Improving the quality of the learning environment

Curriculum reform

Curricular reforms in the East Asia and Pacific region have often been accompanied by a change in pedagogical practices, with a focus on the development of new content on a particular topic, new learning materials and pre- or in-service teacher training to adjust to new evidence-based practices.

Development of high-quality teaching and learning materials

The scope includes the impact of teaching quality and learning materials (also sometimes referred to as ‘teaching and learning resources’) on educational outcomes. This includes the quality of pedagogical design; accessibility by children with disabilities; cultural relevance; technical aspects like readability, format, colour; and user-friendliness in different media, such as paper, multimedia, online and mobile telephone.

Introduction of learner- and teacher-focused information and communication technology-based education platforms

The scope includes the impact of the affordances of educational technologies and education platforms on educational outcomes. Information and communication technologies (ICT) include desk-based as well as mobile phone technologies and encompasses all modes of delivery, be it online, offline or blended (a combination of online and offline). ‘Affordances’ describe the educational capabilities and possibilities of ICT.

Improving school infrastructure

The scope includes the construction of school buildings and classrooms, school renovations and addition of school accessibility features.

What works to improve learning?

Several strategies appear more successful in improving learning outcomes than others across the various intervention types in this area.

Box 9: Twenty-first-century or transferable skills framework

Twenty-first-century skills, also known as transferable skills, life skills, soft skills or socioemotional skills, are higher-order cognitive and non-cognitive skills that allow young people to become agile, adaptive learners and citizens equipped to navigate personal, academic, social and economic challenges. Transferable skills work alongside knowledge and values to connect, reinforce and develop other skills and build further knowledge.

Development of high-quality teaching

Curriculum reform for twenty-first-century skills

There is good evidence that well-implemented curricular reforms, accompanied by reforms in teacher education, can be a dominant driver of improvements in students' learning achievement in the long term (Cheng, 2017). To be effective, though, curriculum reform requires deep, sometimes even radical, shifts in educational approach. Evidence from the region shows that impactful curricula reform begins with changes in the overall curriculum objectives and expected pedagogic styles. Strong philosophical changes demand significant shifts in educational practices at all levels and thus take time to implement and produce results.

Recent curriculum reforms in East Asia and Pacific focused on making education systems more aligned to help children gain twenty-first-century skills. All of them instituted deep, structural and philosophical changes to their education systems by changing the overall objectives of learning, from a 'knowledge-based' approach to a 'competence-based' approach (see Box 10). This substantive shift calls for a fundamental swing in the culture of education. Such structural changes proved to have a strong impact on children's learning, although only with time and after significant investment in implementation.

Box 10: Examples of twenty-first-century curriculum reform goals in Asia

A review of curriculum reforms in the region found that most reforms have focused on similar goals and objectives, including: development of self; interpersonal relations; thinking skills; good citizenship and social participation; contribution to the global world; and basic knowledge and new knowledge (Cheng, 2017). This contrasts significantly with previous curricula, which focused on a transfer of knowledge from teachers to students.

In Viet Nam, a curriculum pilot programme known as the Viet Nam Escuela Nueva Programme curriculum model proved to have a positive impact on cognitive language and maths and the non-cognitive achievement of children and led to nationwide curriculum reform (see Box 11). The Escuela Nueva classrooms provide significantly more time for students to practise and develop twenty-first-century skills at a higher level than what was offered in traditional classrooms. The pilot curriculum change led to enhanced school quality, participatory and collaborative learning, twenty-first-century skills among students and teacher development systems (Parandekar et al., 2017).

Reforms can impact different groups of children differently. Interestingly, some evidence from the region shows important gender differences in the uptake of twenty-first-century skills. A study in Malaysia and Brunei Darussalam assessed primary school boys' and girls' inventive thinking skills in science covering adaptability and managing complexity, self-direction, curiosity, creativity, risk taking, higher-order thinking and sound reasoning. The study found that boys are more likely to acquire adaptability and manage complexity skills but that girls are more likely to achieve in curiosity and risk-taking domains (Abdullah & Osman, 2010).



Box 11: Case study – Viet Nam Escuela Nueva Programme

The Viet Nam Escuela Nueva Programme includes child-centred pedagogy, self-study and flexible organization. It created specific learning materials for autonomous work. It is based on a successful multigrade classroom model first developed in Colombia and integrates (a) participatory and collaborative learning; (b) self-paced learning guides; (c) student government; (d) formative assessments combined with summative assessments; (e) application or real-life oriented learning, with community integration; and (f) professional networks for teachers.

The programme has improved teacher training on how to both encourage and support the development of non-cognitive skills. It provides teachers with follow-up support, including a professional network. Important advancement markers for twenty-first-century skills from both the teacher and student perspectives can be leveraged when training teachers on how to both encourage and support the development of non-cognitive skills.

Escuela Nueva schools provide much more space for students to develop and practise twenty-first-century skills, such as leadership, teamwork and cooperative learning, communication and self-managed learning. Some of the interactions involving twenty-first-century skills are still at a basic level, but the majority tend to be at intermediate and advanced levels. The programme found that important advancement markers for twenty-first-century skills from both the teachers' and students' perspectives can be leveraged when training teachers on how to both encourage and support the development of non-cognitive skills.

An impact evaluation of the Escuela Nueva Programme, which followed a cohort of students from Grade 3 through Grade 5 in rural Viet Nam and compared the results to a counterfactual group, revealed that the programme had positive impacts on cognitive and non-cognitive learning outcomes.

Source: Parandekar et al., 2017.

Another good piece of evidence comes from the Taiwan Province of China, which 'modernized' its curriculum for the twenty-first century by decentralizing, localizing and globalizing its approach (see Box 12). This large-scale and somewhat radical reform enabled Taiwan Province of China to maintain its already high level of student learning outcomes and maintain its place as one of the best performers in international assessments.

Experiences from the region highlight four critical factors to ensuring that curricula reforms lead to improvements in children's learning:

1. Curricular shifts must be supported by shifts in the role of teachers (Cheng, 2017). Comprehensive preparation, training and continuous support for teachers before and throughout any reform are essential for its success. Often, policymakers invest heavily in developing a reform and then, in a rush to put it in place, underplan for teacher training, which is the lynchpin of a successful reform implementation. This was a strong lesson learned in Taiwan Province of China's curriculum reform, where, at first, teacher education did not sufficiently accompany the curricular reform (Lin et al., 2014).

2. Assessment is also crucial to impactful curriculum reforms and often poses the most serious challenges to implementation of twenty-first-century competency reforms (Cheng, 2017). In East Asia, high-stakes examination systems have created obstacles for curriculum reforms (Cheng, 2017), although some countries have introduced promising practices. Assessment frameworks and approaches must be considered in parallel with the development of curriculum frameworks and content. Twenty-first-century reforms call for a shift from what children know to what children can do. A real assessment of students' ability to use their knowledge should be their ability to apply what they have learned to real-life situations and in collaborative groups. Hence, the ideal assessment should be creative, integrative, practical and collaborative, which is rare and difficult to introduce (Cheng, 2017).
3. The evidence from Taiwan Province of China also demonstrates that curricular reforms require continuous adjustment in the years after their initial introduction and that those adjustments can determine the impacts on learning. The experience in the Taiwan Province of China reflects that curriculum reform with teacher education adjustments contributed the most in terms of cultivating various literacies and competencies among students and that they are the most influential aspects in the education reform (Lin et al., 2014).
4. Interesting piece of evidence from the Solomon Islands shows that teachers' ownership and understanding of curriculum content is also important for ensuring a positive impact on learning. A 2014 study examined teachers' perception of curriculum in terms of interest, authenticity, appropriateness, organization, balance and technical quality, based on the analysis of open-ended survey responses. The researchers found that curricula imported from outside the country (Australia and Papua New Guinea) were viewed as inappropriate and of poor quality by teachers. In contrast, the social studies curriculum, which was developed locally, was viewed as being of better quality, more appropriate and better balanced and organized. These results highlight the importance of adapting the curriculum materials to the local context (Lingam et al., 2014) and engaging teachers in the curriculum development process.



Box 12: Case study: Curricular reform in Taiwan Province of China

Entering the twenty-first century, the education reform agenda in the Taiwan Province of China aimed to strengthen the competitiveness of human resources in the knowledge-based global economy. The Grade 1–9 Integrated Curriculum reform sought to develop students' capability of responding to the challenges posed by globalization in the twenty-first century.

The curriculum reform sought to cope with two major systematic problems: the control of the education system by the State and examination pressure. It was expected that this curriculum reform could change the long-lasting, widespread school practices that received the greatest criticism (such as rote learning, cram school attendance and endless practise and tests). The ultimate objective was to change from a focus on 'subject-centred knowledge' to 'student-centred life experience'. The goals of the curriculum reform were to help students develop humanitarian attitudes, enhance integration ability, cultivate democratic literacy, foster native awareness and global perspective and build up capacity for lifelong learning. To achieve these goals, the curriculum reform:

- decentralized the previous national curriculum and contextualized the school-based conditions;
- integrated all the traditional subjects into seven overarching learning areas: language arts, health and physical education, social studies, arts and humanities, mathematics, science and technology, and integrative activities;
- made both local dialects and English required courses to cultivate youths' mother tongue ability as well as their foreign language proficiency in the globalized age;
- introduced constructivist mathematics; and
- gave high schools more flexibility to select students based on non-academic criteria (Lin et al., 2014).

Implementation of the reform was less than smooth. It was done without "proper auxiliary plans and relevant training" (Lin et al., 2014). And no corresponding teacher training was delivered for the new curriculum. The new curriculum gave teachers more autonomy, but most teachers were not prepared to develop their own teaching methods and materials. The constructivist approach to teaching mathematics, which comes from the West, is one of the innovative ways for math instruction. But due to the vaguely defined and decontextualized curriculum guidelines, together with the fact that most math teachers were not prepared in both effective and cognitive aspects to face such a huge change, this initiative eventually failed to achieve its intended consequences (Lin et al., 2014).

The Ministry of Education responded to each of these challenges by ensuring that the system kept reflecting on its reforming practices and making various efforts to adjust. As a result, student achievement remained high, according to performance on international large-scale assessments. In addition, the reform showed that increasing the awareness of valuing cultural diversity and improving gender equality (Teng et al., 2012) contributes to the excellent performance of Taiwanese Province of China students globally.

Improving teaching learning materials

Improving the quality, number and type of teaching and learning materials in the classroom can have a significant impact on foundational literacy and numeracy under the right conditions, as does teacher preparation and the implementation context, particularly in the early grades of primary school. This is poignantly true when the materials are focused on improving children's performance in a certain area, such as early grade reading. However, the analysis shows for new teaching learning materials to have an impact, they must be accompanied by substantial teacher training and support.

In East Asia and Pacific, new reading materials and other early grade reading supports have been introduced in many classrooms to assist students who have low reading skills. Programmes in Cambodia, Indonesia, the Lao PDR, the Philippines and Papua New Guinea have shown strong success rates in improving student learning (Abeberese et al., 2011; Myriad Research, 2017; Nonoyama-Tarumi & Bredenberg, 2009; Spier et al., 2019).

In Indonesia, the Rural and Remote Education Initiative for Papuan Provinces introduced innovations to the learning environment, accompanied by teacher training, that greatly increased learning. Interventions focused on the remote rural provinces with new teaching learning materials, teacher training sessions, physical changes in the classroom, including establishment of reading corners and displays of learning materials, and community-building (UNICEF, 2017) (see Box 14).

In the Philippines, a short 31-day reading programme introduced new age-appropriate reading materials and teacher training on the use of these materials. Assessment results showed that the programme increased the proportion of students who read a book in school within that first month by 19 percentage points. Children participating in the programme reported reading 2.3 more books than control students. The programme also increased students' reading skills by 0.13 SD. The positive effect persisted three months after the programme but reduced to 0.06 SD, which may be due to less emphasis on reading after the end of the programme. There is also evidence that the programme encouraged children to read more on their own at home. This programme reinforces the findings from area 1, that targeted reading interventions in the early years have a positive impact on learning.

Similar results were found after pedagogical innovations were introduced in primary schools in Pakistan as part of the Children Resources International (CRI) Programme. A critical component of transforming classrooms in that programme included establishing activity centres to help children interactively explore their lessons. In each CRI classroom, a number of activity centres were established: mathematics, science, literacy, art and dramatic play. To activate these centres, CRI provided classrooms with teaching and learning aids, including furniture and other material inputs, such as basic building blocks, prisms and magnifying glasses. When combined with teacher training and regular teacher monitoring by master trainers, these new methods were effective in raising student learning achievement. The average gain in learning achievement improved average students' ranking by 4–11 percentiles in relation to other students in the cohort (Naseer et al., 2010).

In remote and rural areas of Papua New Guinea, improvements in reading outcomes were highly correlated with specific changes in the classroom environment and in addition to the programme intervention to improve reading (testing models for delivering in-service teacher training). Changes included adding a reading corner and displaying a variety of learning materials and students' work (Myriad Research, 2017).



In all three cases, the evidence shows that teacher preparation is critical to ensure that changes in teaching and learning materials truly impact the learning environment. However, the introduction of new curricula and learning and teaching resources does not necessarily have a positive effect on learning outcomes without teacher professional development (Busingye & Najjuma, 2015). Studies that reported on less successful strategies in improving the quality of the learning environment in many cases related the lack of influence on the missing links between new resources and their use in the classroom. This is also supported by the evidence from the Solomon Islands on the contextualization of curricula (Lingam et al., 2014).

ICT use in the classroom

Prior to the COVID-19 pandemic, there was a strong drive to equip students with twenty-first-century skills. In the context of the COVID-19 remote learning programmes, many countries found that these skills were not strongly embedded enough in teachers' and students' abilities. Most countries agree that children must be equipped with digital age proficiencies, digital-ready classroom environments and ICT devices for learning. Digital skills have become a core pillar of modern curricula reform (Abdullah & Osman, 2010). In addition, teacher and/or student-centred e-learning¹⁷ platforms are seen as potential tools for boosting learning among disadvantaged groups. But does enhancing ICT in the classroom lead to better learning outcomes?

Evidence from the region is limited, and global evidence on the impact of ICT use on children's learning is mixed. Generally, the evidence from OECD countries shows that ICT use, when approached in an appropriate, well-integrated and quality manner, can have a positive impact on education system outputs and learning (Aristovnik, 2012). Programmes that provided computers for all students in the United States (California and Colorado) and were complemented with teacher training, curricular reform and technical support had positive learning outcomes. Similar laptop provision interventions that focused on disadvantaged populations find that learning improvements – and reducing the technological inequity – occurred when the curriculum and teacher training were tailored to the needs of those students (Andreasson, 2014).

Limits to the use of technology have been seen in countries with more experience in adapting innovation use in the learning process. Their experience suggests that the introduction of ICT in curricula reform is still incomplete and that adding ICT to the classroom is not guaranteed to bring about positive changes in learning outcomes nor in pedagogical approaches (Baron & Harrari, 2005). For example, despite 20 years of large-scale ICT introduction in primary schools in France, a majority of teachers use computers as 'just another tool' but without bringing dramatic change to the learning process (Baron & Harrari, 2005).

Evidence from similar studies in Latin America show that simply providing internet access or computers to learners does not improve learning outcomes generally or in mathematics. In both Peru and Uruguay, national programmes contributed to increasing access to ICT in classrooms and computer use in the home. Yet, measurable impacts on academic achievement were not observed in either country.

Evidence from the East Asia and Pacific region on the effectiveness of ICT programmes for improving learning is limited because it is still quite new in many countries. And many countries remain behind in terms of advancing ICT and education policies. Also, the ICT programmes that exist are mostly small-scale pilot innovations or add-ons to other programmes and thus have had limited results and lack of rigorous evaluation procedures. There is some evidence

¹⁷ Electronic learning is a widely used term in business, industry and education. Google e-learning is in excess of 100 million hits. The term e-learning is apt for education because it combines in its name e (electronic) and learning and thus emphasizes learning in a way that the term ICT does not (UNESCO, 2010).

from the region – China, Cambodia and Japan – that gives helpful indicators of successful practices for integrating ICT to maximize the impact on learning.

Two studies from China reflect the benefits on learning after ICT integration in the curriculum. In China, a randomized study of the One Laptop Per Child programme, a global initiative to narrow the inequality of access to ICT devices, found that increasing children's access to laptops improved their computer skills by 0.33 SD and math scores by 0.17 SD. The programme also increased student time spent using educational software, decreased student time spent watching TV and improved student self-esteem (Mo et al., 2013).

Another Chinese government programme, the National Schools Modern Distance Education Project in Rural Areas, aimed to develop ICT in rural education at a low cost by focusing on seven aspects of basic education: ICT infrastructure, ICT resources construction, the status quo of ICT education in schools, educational technology standards for teachers in schools, policies and regulations, criterion-building for ICT application in instruction and ICT in Chinese rural areas. Although no information is available on its impact on learning outcomes, the programme showed positive transformations in the way of presenting learning materials, learners' learning style and teachers' instructional method. It also facilitated the improvement of rural education quality and helped bridge the digital divide between rural and urban areas (Jingtao et al., 2010).

Students' perceptions of technology and learning can be important in whether ICT actually has an impact. In Cambodia and Japan, evidence indicates that students perceive technology (mobile phones and computers) as useful for learning in all core subjects but particularly for foreign language and science (Elwood & Maclean, 2009). Students in both countries reported learning their ICT skills from computers and cell phones, being comfortable with technology and having no anxiety about incorporating ICT into their learning processes. Given that children in Japan have greater access to technology, the study found that access does not necessarily equate with proficiency or even willingness to use technology (Elwood & Maclean, 2009).

One interesting distinction between the two countries was that, overall, Japanese students exhibited greater distinction and range in their choices when given the option to use technology or paper to accomplish various tasks. Whereas, Cambodian students opted for technology in every situation and displayed a narrower (perhaps less discriminate) range for those choices. This may indicate that children with greater access to technology are more adept at discerning when it is most appropriate to use (Elwood & Maclean, 2009).

National policy developments can determine the impact of ICT on learning outcomes or they can hinder learning. In the Asia-Pacific region, ICT in education was analysed as a mechanism to achieve SDG 4. Various action points for 2017–2022 were identified, with three of the four priority areas also pertaining to primary education (such as ICT for improving the quality of teaching and teaching practices; ICT for enabling inclusion and equality in education; and ICT for monitoring and evaluation) (Richardson, 2008). In Malaysia, the education policy alignment with the national development plan recognizes the importance of the learning process and encourages the use of ICT in education. Yet, some ICT interventions in schools are hampered or nullified by national policies. In Cambodia, for instance, the implementation of an ICT policy in education reform faced slow progress due to the failure to fully address the political aspects of planning, coalition-building and policy prioritization (Richardson, 2008).

ICT and education is a fast-changing area. The COVID-19 pandemic created a surge in the use of ICT in education in the region. Almost all countries now have online remote learning programmes to ensure the continuity of education during extended school closures, regardless of their development status and stage in introducing ICT into the national curriculum policies.



Data are not yet available on the impact of these systems on children's learning. UNICEF and the International Telecommunication Union (ITU) estimate that 40 per cent of students whose schools were closed as of May 2020 did not have access to the internet (UNICEF & International Telecommunication Union, 2020). In addition to these large inequities in internet access, TV and radio access also varies considerably across and within countries. Most countries (91 per cent) globally have also taken measures to support populations at risk of being excluded from distance learning platforms, most commonly learners with disabilities. More than 30 per cent of low-income countries have not introduced any measure to support access or inclusion. In many countries, the online learning platforms that were created will continue to function once schools reopen and thus will transform education systems, creating many lessons learned and opportunities for diversifying learning channels. For example, in Timor-Leste, all schools were closed on 23 March 2020, after the first case of COVID-19 was identified in the country, affecting about 400,000 learners. UNICEF worked with the Ministry of Education to put in place a distance learning programme that remained when the pandemic restrictions ended (see Box 13).

Box 13: Learning Passport in Timor-Leste

Setting up distance learning to support all children was a challenge because distance learning

had never been tried at scale in Timor-Leste. In a matter of weeks, the Ministry of Education, with support from UNICEF, established a distance learning programme – *Eskola ba Uma* – through multiple channels, including TV, radio, SMS, print materials and a new digital learning platform (Tubio, 2020).

The Learning Passport online platform – a collaborative effort of UNICEF and Microsoft – gave children remote access to their national school curriculum via a child-friendly platform with textbooks, storybooks, songs, videos and supplementary learning materials. It offers a built-in assessment feature to track a learner's level of completion or consumption. A mobile app was developed to extend the online platform to smartphone users so that families can download materials, which allows learners the opportunity to study without regular access to the internet.

The online learning platform now continues to benefit children and teachers. New programmes are being developed to support children's learning, new skills-based certificates are being offered for out-of-school adolescents and adaptations of learning materials for children with disabilities and teacher training opportunities are also being made available. A total of 68 video lessons (based on the primary school curriculum), 40 audiobooks and various ICT tutorials for teachers were prepared. For the reopening of schools, it was used successfully to prepare teachers, reaching 95 per cent of the work force, or more than 15,000 teachers, through online training. As of September 2020, the total number of registered users had climbed to 23,454. While no impact evaluation has been conducted, but initial feedback is very promising, showing that diversifying learning channels may have a positive impact on quality and learning.

Source: (Tubio, 2020)

The COVID-19 school closures have brought significant attention to the equity gap between children who have access to devices and connectivity and those who do not. Targeted improvement to the quality of the digital environment for certain disadvantaged groups, therefore, may be critical to narrowing the digital divide. Rural students, for example, are more likely to suffer from lack of access to digital learning environments. There is also evidence from East Asia and the Pacific that girls may be at a greater disadvantage in ICT-based learning environments (Elwood & Maclean, 2009). This equity gap is very likely to increasingly impact children's learning – positively for those who have access and negatively for those who do not.

UNESCO recommends that integrating ICT meaningfully into education is a process that must target both technology and pedagogy (see Box 14).

Box 14: Stages of ICT integration in education

ICT integration has two dimensions: technology and pedagogy. Technology refers to all the technologies that ICT comprises, and pedagogy is the art and science of teaching. The pedagogy dimension is also a continuum and represents changed teaching practices resulting from adoption of ICT. Within these two dimensions are four stages that classes or schools typically pass through in their integration of ICT:

Emerging phase. Schools at the emerging stage have just begun to introduce computers. Initially, they may have only one or two computers and a printer, either donated or purchased by the education department. At the start of their journey along the ICT road, administrators and one or more pioneering teachers begin to explore the potential of ICT for school management and for classroom teaching.

Applying phase. Schools at the applying stage have acquired additional ICT equipment throughout their organization and are usually in countries where there are national ICT policies in place and where various ICT strategies are being trialled. School administrators use ICT for more organizational and management tasks. Teachers begin to adapt the curriculum to increase the use of ICT in different subject areas, applying specific software tools, such as drawing, designing, modelling and simulations, in their teaching.

Infusing phase. Schools are incorporating ICT across the curriculum. The terms integrating, embedding, infusing, which are largely synonymous, are all used. Almost all classrooms are equipped with computers at this stage, as are school offices and the library. And schools have internet connections. A variety of other ICT is in evidence across the institution, in classrooms, laboratories and administrative offices.

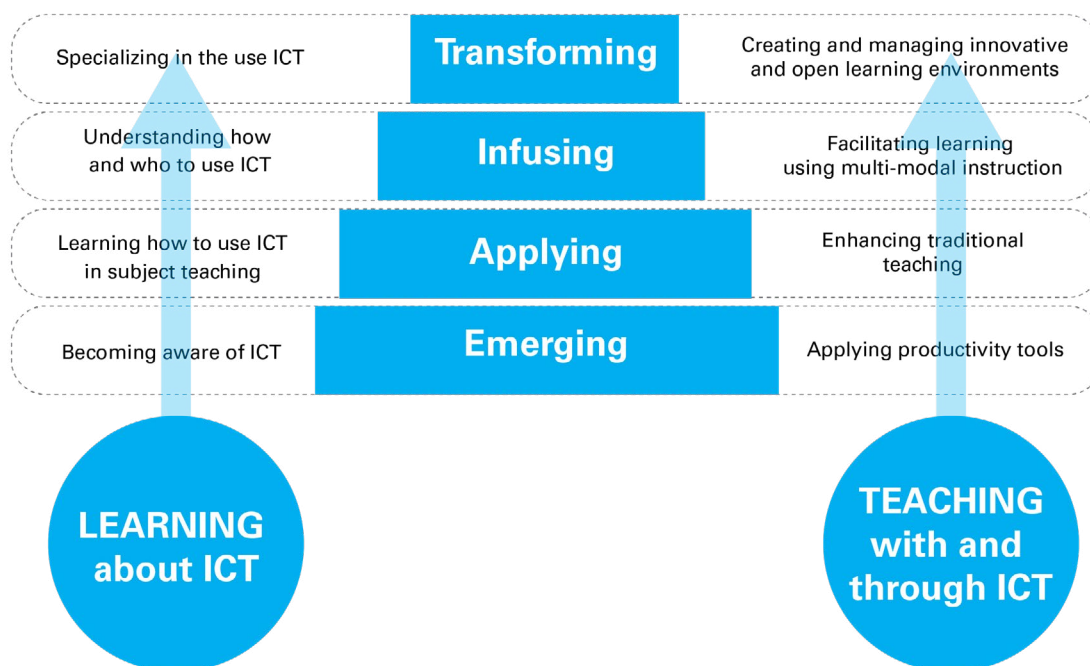
Transforming phase. ICT may be taught as a separate subject at senior levels of secondary schools and incorporated into vocational areas. Teachers with expertise in ICT may be on staff along with other subject specialists. When the transforming stage is reached, the whole ethos of the institution is changed. Teachers and other support staff regard ICT as a natural part of the everyday life of their institutions, which have become centres of learning for their communities.

Source: UNESCO, 2016b.



Figure 6 maps the process of ICT integration against specific learning and teaching processes.

Figure 6: Mapping ICT stages onto learning and teaching processes



Source: UNESCO, 2016b, based on Majumdar, 2005 and Anderson and van Weert, 2002.

School infrastructure

There is some limited evidence that investing in infrastructure improvements in the most disadvantaged schools can help academic achievement, largely through increased participation. A study in the Philippines examined various dimensions of school infrastructure and utilities to determine the effects of school facilities on learning by school location. Schools in sparsely populated rural areas with basic facilities performed better than schools in urban areas with poor facilities, indicating that the impact of basic facilities are important in remote schools (Figuroa et al., 2016). Improving water, sanitation and hygiene facilities in underresourced schools may also lead to better participation in school and thus to better learning.

For children with disabilities, improvements to the quality of the learning environment can have a positive impact on learning experiences and outcomes, particularly in early childhood (UNESCO, 2016a). For example, the Lao PDR Inclusive Education Project (1993–2009) resulted in greater enrolment rates for children with disabilities in partner schools. It also showed significant progress in learning outcomes among children with disabilities and special education needs.



AREA 2:

IMPROVING EARLY LEARNING OPPORTUNITIES AND THE TRANSITION TO PRIMARY SCHOOL

SUMMARY OF MESSAGES

- There is good evidence that well-implemented curricular reforms, accompanied by reforms in teacher education, can be a dominant driver of improvements in students' learning achievement in the long term.
- Impactful curricula reform must begin with meaningful changes in the curriculum objectives. And it must be accompanied with parallel reforms of assessment and teaching training systems and designing an iterative reform process, whereby continuous adjustments are made to respond to needs. Teachers' ownership of curriculum content is also important to ensure a positive impact on learning.
- Improvements in learning materials and classroom environment can improve learning when accompanied by teacher preparation and by introducing new and improved learning materials interventions that focus on early grade reading or school readiness.
- ICT skills are essential for twenty-first-century learners, especially in the context of the COVID-19 pandemic. ICT interventions present new opportunities to boost learning among those falling behind. But they must be accompanied by appropriate training and support for teachers and learners.
- There is limited evidence on the impact of ICT interventions in education on learning. Findings from studies in the region show that impact on learning depends on the context, the effectiveness of implementation, access to devices and teacher capacity. COVID-19 remote learning programmes present the opportunity to research and better understand the strengths, weaknesses and opportunities created by ICT in education.
- There is some evidence that investing in infrastructure improvements in the most disadvantaged schools can help academic achievement, largely through increased participation.





On 14 April 2020, a girl shows off the online platform on which children and parents in Timor-Leste can access a range of audio-visual material to help students continue learning during ongoing school closures. Television programmes, radio programmes and e-books, as well as a book for parents to explain COVID-19 to children with neurodevelopmental needs, are available on the Learning Passport platform developed by Microsoft, UNICEF and the University of Cambridge. Schools in Timor-Leste have been closed since 23 March 2020 as part of national efforts to prevent the spread of COVID-19.



3.3 Targeted learning interventions for children falling behind (area 3)

Children from the most disadvantaged communities are the most likely to fall behind in learning outcomes. This is even more important in the wake of COVID-19 school closures, during which the most disadvantaged children have been the most likely to experience a loss of learning. Across East Asia and Pacific, countries have put in place a variety of interventions to reduce disparity gaps in student performance. Such interventions aim to boost learning among children falling behind, largely through remedial support and inclusive pedagogies. This section reviews evidence from interventions that aim to address the learning needs of lowest performers (see Box 15). This includes:

- remedial education programmes targeting underperforming students (Brown, 2013; Little, 1995);
- student incentives to boost learning (Barrera-Osorio & Filmer, 2016; Kremer et al., 2009);
- mother tongue-based and multilingual education programmes (Aikman & Pridmore, 2001; Benson, 2005; Benson & Wong, 2019; Brown, 2013; Fillmore & Handayani, 2018; UNICEF, 2015a; Walter & Dekker, 2011);
- multigrade teaching programmes for remote areas (Aikman & Pridmore, 2001; Benson & Wong, 2019; Lingam, 2014; Little, 1995); and
- disability inclusive pedagogies and policies (Chong, 2016; Clarke & Sawyer, 2014; UNESCO, 2016b).

Box 15: Scope of area 3 : Targeted learning interventions for children falling behind

Remedial education interventions for low performers at risk of dropping out of school

Remedial interventions are specific educational interventions (in formal or non-formal settings) aimed at addressing the learning needs of children who are lagging academically or not mastering specific competencies in the early grades. They are quite diverse in their objectives, scope and duration. Some examples of remedial interventions include non-formal bridge programmes, special thematic instruction in the classroom and private tutoring. Few programmes have received rigorous review in the East Asia and Pacific region.

Student incentives

Student incentives are financial or material incentives provided to students, most often from marginalized communities, to improve learning. Incentives can be conditional or unconditional.

Mother tongue and multilingual education programmes

Multicultural or multilingual education guarantees opportunities for minority people's education and tries to preserve their culture. Children whose primary language is not the language of instruction in school are more likely to drop out of school or fail in early

grades (Ball, 2014, 2019). Children and adolescents from minority groups are more likely to be overage and have lower primary and lower secondary completion rates (World Bank, 2018a).

Multigrade teaching approaches

Multigrade teaching approaches are diverse in their implementation of instructional delivery and classroom management. They can include teachers moving from one grade to another (in the same or different classrooms); teachers working in small groups divided according to various ages, abilities or grades; teachers working with multiple grades and combining multiple student levels to form teaching groups; and teachers supervising children working individually or in group-based projects (such as in Montessori pedagogy). Multigrade teaching is most often found in rural areas, where the scarcity of students, teachers or resources create the conditions for combining children from various grades with one teacher.

Inclusive education for children with disabilities and other groups of excluded children

This review employs the definition and measure of disability recommended by the Washington Group, which is one of the most widely accepted and internationally tested tools. Based on the integrated biopsychosocial framework for understanding disability, the International Classification of Functioning, Disability and Health (developed by the World Health Organization), the Washington Group Short Set uses a four-level scale (no; some; a lot of difficulty; cannot do entirely) to capture an individual's degree of functional ability in six basic physical and mental domains (seeing, hearing, walking, remembering and concentrating, self-care and communication). If limited, these abilities render children vulnerable to being excluded from independent participation in society.

What works to improve learning?

This section highlights that targeted learning and remedial catch-up programmes (like school readiness programmes) may have strong potential for boosting children's learning in the short term. This is especially true for children from the most disadvantaged background and those in the early grades of primary school.

Remedial education and catch-up programmes

Evidence from China and Indonesia show that well-implemented remedial catch-up programmes have a positive impact on student learning outcomes in specific contexts.

In Indonesia, the successful Rural and Remote Education Initiative for Papuan Provinces targeted improvement in reading outcomes for primary children in the two provinces with the lowest literacy rates and human development indices. The programme provided a package of interventions to underperforming schools. It included teacher training, awareness-raising with community and parents, new learning materials and a structured pedagogy for learning to read. The overall results from a randomized evaluation showed that students' reading ability in the programme schools increased significantly. This increase was proven in all of the Early Grades Reading Assessment sub-tasks: letter-sound identification; initial sound identification; non-word reading; oral passage reading; reading comprehension; listening comprehension; oral vocabulary; and dictation. The improvements in learning were the largest among the students

who had the lowest levels of literacy at the start (non-readers) and were significant within each sub-task for all six districts. Children in the control schools showed no improvement in reading outcomes (see Box 16).

Box 16: Rural and Remote Education Initiative for Papuan Provinces in Indonesia

Papua and West Papua provinces rank among the lowest in Indonesia across most human development indices. As a result, Papua and West Papua are both provinces with a high prevalence of illiteracy and poverty (UNESCO and MOEC, 2012). UNICEF (2012a) revealed significant disparities in literacy rates between urban and rural Papuans, with higher illiteracy in rural areas (49 per cent) than in urban areas (5 per cent). Disparities were most pronounced in the highland districts, where rates of illiteracy ranged from 48 per cent to 92 per cent. The data also showed inequality in access to quality education in the two provinces.

The programme had a clear positive impact on learners in the two Papuan provinces. In addition to improving overall reading outcomes, further analysis found that the increase in reading ability highly correlated with the changes applied by the intervention schools at the classroom level. For example, prior to the intervention, less than 20 per cent of classrooms had a reading corner and the classroom walls did not display any learning materials or students' work. Now, more than 75 per cent of classrooms have reading corners, and classroom walls display a variety of learning materials. Other activities, such as training sessions for teachers and head teachers, also positively supported students in their reading outcome.

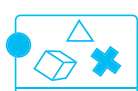
Another important contributor to success was the support for other stakeholders. The evaluation revealed an increase in the school committee's role to support the education process. Although the increase was not evenly distributed at every school, it brought good benefits for those that were improved. The support given was not only in the form of material assistance, such as by providing electricity, painting schools, building fences and fulfilling other school needs, but also increasing society's awareness regarding the importance of education.

The local government, represented by the District Education Office, was also providing support for the programme. Assigning principals based on their experience assisted in engaging individuals who were committed to conducting the intervention programme. The impacts of the programme on teacher practices, parent participation, community mobilization and government capacity all contributed to the sustainability of achievements. The programme is now being expanded to other provinces in Indonesia.

Source: UNICEF, 2017

Another similar remedial reading programme in Indonesia, the Literacy Boost programme, improved reading skills of children in Grade 2 of primary education by reinforcing literacy inside and outside the classroom. Students in schools with the Literacy Boost programme made statistically significant small improvements over peers in comparison schools and had higher-level reading skills (oral comprehension, reading comprehension and reading fluency). Children gained nearly a year of growth in oral comprehension (Brown, 2013).

Equity-targeted programmes have had varying impacts for girls and boys. For example, girls in Literacy Boost schools scored significantly higher than boys in five out of eight assessment areas, although this might be related to external factors, such as poorer health and lower



preschool attendance among boys. But girls from larger families performed worse than other girls. And poorer students made less progress in certain pre-reading skills (Brown, 2013).

Technology may help strengthen learning through remedial programmes. Adaptive computer-assisted remediation programmes are specialized software for the development of cognitive skills, such as mathematical computing or reading comprehension. These programmes can improve learning outcomes by 'personalizing' education to the learning needs of students, known as 'teaching at the right level'. The adaptive computer-assisted remediation programmes take advantage of emerging artificial intelligence and machine learning techniques to model students' cognitive processes, deliver content accordingly and ensure, through periodic assessments, that students master curricular content appropriately. They can also provide students with different pedagogical strategies for learning methods and, in turn, provide immediate feedback to students and teachers with quick and regular data to monitor student learning (Angel-Urdinola, 2020).

Evidence from China shows that computer-assisted remedial learning programmes were effective in improving the overall academic performance of students in both language and mathematics in several provinces (Lu et al., 2016; Mo et al., 2013). Two randomized interventions distributed computer-assisted remedial software programmes to impoverished schools serving migrant children outside Beijing and remote rural communities, home to ethnic minority groups. The programme results showed an increase in learning outcomes in mathematics and mandarin language (Andreasson, 2014). In contrast to the Literacy Boost programme, China's software-based remedial education programmes had an equal impact on boys and girls, even though girls used computers far less than boys in China and had a lower skill level. Still, they gained as much as the boys from computer-based interventions in schools (Andreasson, 2014).

Multilingual education

The East Asia and Pacific region is the most linguistically diverse in the world, with 51 per cent of the world's languages. Migration across borders has only added to its linguistic diversity. This diversity is an asset for the region but also challenges education systems to develop strategies to include learners who do not speak the 'language of instruction' at home. In many countries across the region, children enter the first year of schooling having spoken another language in the home and not knowing the language of instruction. Many alternative programmes for such children have been implemented in the region.

Evidence from these programmes conclusively, consistently and clearly demonstrate a positive impact on ethno-linguistic minority children's learning outcomes. Mother tongue-based multilingual education programmes are a strongly evidenced equity-based approach that can improve access to quality education and learning to girls and boys who face issues of access, quality, efficiency and equity of opportunity. These programmes are proven to create an academic, social and cultural bridge that helps children transition to school and improves learning outcomes in all subjects. This finding is demonstrated by research in Cambodia, Indonesia, the Lao PDR, the Philippines, Thailand and Viet Nam.

The Patani Malay–Thai Multilingual Education Programme in the South of Thailand has demonstrated over the past decade the effectiveness of multilingual education on learning outcomes for children. A study on the programme showed that using children's mother tongue as the language of instruction in the early years of primary education and slowly transitioning to Thai as the language of instruction improves their learning outcomes in all subjects and helps them learn better Thai faster. The impact of the programme continued through primary schools and enabled students to improve their performance on the national assessment (see Box 17).

The findings from the Thailand experiences are reinforced by evidence from across the region:

- In **Viet Nam**, an evaluation of the Mother Tongue-Based Bilingual Education model showed positive impact on improving the learning outcomes of participating children. The programme is offered from preschool to the end of primary education and uses a flexible approach. It also has been shown to be effective in improving teachers' and managers' capacities (UNICEF, 2015b).
- In the **Lao PDR**, children from non-Lao- or non-Tai-speaking communities participate in either a summer pre-primary course or a Grade 1 transition course. Both programmes have been found to help improve early learning in the Lao PDR (Spier et al., 2019).
- In the **Philippines**, children also showed a consistent and large statistical advantage in an experimental multilingual education programme across all three grades and all subjects in the curriculum, although the advantage varies considerably from grade to grade and subject to subject. The largest gains were observed in the core subjects of reading and math in Grade 3 and math in Grade 1 (Walter & Dekker, 2011).

Another clear benefit of mother tongue-based multilingual education programmes is that ethnolinguistic minority children maintain their home languages, identities and connection to family and community, all of which are known to build up learners' self-esteem and facilitate learning (Benson & Wong, 2019). This can have a direct impact on improving learning because children learn better in environments in which they feel comfortable and accepted.

For example, an evaluation of a multilingual education programme for ethnolinguistic minority learners in north-eastern Cambodia found that the participating students performed better overall but that they also benefited from the additional advantages of stronger links between their home and school communities. A review of multilingual education programme assessments reinforced that the language of instruction is strongly associated to equity in education while teaching in the learners' mother tongue is a powerful tool for a more inclusive education, especially for girls and women (Benson, 2005).

Evidence from a promising programme in West Nusa Tenggara, Indonesia, reflects how multilingual education programmes benefit children learning twenty-first-century transferable skills. The programme works with a range of teachers to design locally driven ways to improve learning outcomes for students whose first language is not Bahasa Indonesia. The pilot increased student confidence to communicate (Fillmore & Handayani, 2018).

Multilingual education programmes are most effective when supported by flexible national language policies (of which mother tongue-based multilingual education is only one aspect). Effective language policies can be achieved with the proper framework, the active participation of stakeholders and inputs from contextualized research. These factors can have important implications for improving student learning and reducing the dropout rate. For example, a review of multilingual implementation challenges highlighted the importance of focusing on language policies as a bridge from learners' non-dominant language to the nation's dominant language to limit transition challenges (Trudell & Young, 2016).

Good practices emanating from such programmes include authorizing oral mother tongue use in the classroom; hiring teachers from the same linguistic group as their students; implementing mother tongue-based teaching at the preschool level; and providing in-service training for teachers in first and second language development (Benson, 2005).



Box 17: Bridge to a brighter tomorrow: Patani Malay–Thai Multilingual Education Programme, Thailand

In Thailand, children who do not speak Thai as their mother tongue face specific difficulties in learning effectively and can be considered as a group in need of special attention and strategies. On average, they are more likely than the general population of children to be excluded from school. They perform poorly in national exams and are more likely to drop out of school. New ways to address this language-related disparity must be implemented for Thailand to achieve Sustainable Development Goal 4 and “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”.

The Patani Malay–Thai Multilingual Education Programme is an action research initiative begun in 2007. The programme follows an adapted curriculum that uses Patani Malay as the main language of instruction in the early years plus a specially developed Thai for Ethnic Children course. The amount of Thai language used in the classroom increases each year. For eight years, assessments paired pilot schools with comparison schools. The comparison schools included in the early assessments followed the normal Thai language-only curriculum. Annual evaluations also tracked student performance and community attitudes.

Based on those learning assessments and evaluations conducted by Thai researchers over the course of eight years, four ‘wins’ emerged for children associated with the programme:

- **Better Thai faster:** Despite spending fewer hours in Thai medium classes, Grade 1 students in the Patani Malay–Thai Multilingual Education Programme schools were 271 per cent more likely than comparison students to score perfectly on a Thai letter dictation test. They were 207 per cent more likely to pass a Thai sentence writing test. And the Grade 3 student essays contained on average twice as many words (104 versus 52), utilized more complex sentences and were 65 per cent more likely to use ‘difficult’ Thai vocabulary.
- **Improved learning of other subjects:** Among Grades 1–6, 73 per cent of the multilingual programme students met basic educational criteria in Thai language, math, science and reading comprehension, compared with only 45 per cent of comparison school students.
- **Improved national assessment scores:** The multilingual programme students scored above the Deep South average in Thai, math and science on the nationwide Grade 6 O-NET exams.
- **Strong community support:** Interviews conducted by the Thailand Research Fund in 2010 and 2015 with more than 200 parents and teachers found strong support for the Patani Malay–Thai Multilingual Education Programme. Most parents cited better Thai reading and writing abilities and improved self-confidence among their children as benefits.

Multigrade teaching

Multigrade schools also have an important impact on access to school for primary school-aged children, particularly those in the most disadvantaged communities living in remote, rural and hard-to-access areas.

A review of innovations in multigrade teaching environments in low- and middle-income countries found that these programmes produce positive results in learning outcomes when implemented well. This means that a curriculum, teacher training and materials need to be adapted to the classroom context (Little, 1995).¹⁸ In assessments of small school projects that created self-study materials in Indonesia, students fared better than those not participating. The Philippine Project IMPACT shows improvement for Grade 4 students in cognitive and socioemotional development. A qualitative study found benefits related to social interdependence, independence, community involvement, self-reliance and cooperation.

Poor-functioning multigrade classrooms can be barriers to student learning, however. In remote locations of Fiji and Viet Nam, for instance, a lack of teacher preparation and support were major stumbling blocks for better student performance (Aikman & Pridmore, 2001). In Fiji as of 2014, teachers lacked preparation to manage multigrade classrooms, and the curriculum was not appropriately adapted to support teachers (Lingam, 2014). Multigrade curricula that neglect language-related barriers can also create obstacles in remote areas where communities have a mother tongue different from the language of instruction, as was the case in Viet Nam in 2001 (Aikman & Pridmore, 2001). These examples underline the importance of teacher preparation and implementation design in achieving impact on learning outcomes.

Student incentives

Incentive programmes for students and parents, such as cash transfer and scholarships, can help improve children's learning. For example, Cambodia tested a scholarship programme to improve primary school attendance and its subsequent impact on learning outcomes. The impact on test scores varied based on the scholarship approach. Merit-based scholarships had positive impacts on children's learning, with test scores increasing by 0.170 SD for the mathematics test and 0.149 SD for the Digitspan test. The merit-based students (and their households) showed a higher level of effort in education, when measured by homework and expenditure on education (Barrera-Osorio & Filmer, 2016).

Disability-inclusive education

For children with disabilities, relevant and adaptive programmes can have a positive impact on learning experiences and outcomes. Inclusive education programmes that take into account individual children's needs, particularly in early childhood, allow children to better integrate into society, to thrive and to become productive individuals (UNESCO, 2016a).

For example, the Lao PDR Inclusive Education Project (1993–2009) aimed to increase the participation of girls of school-going age (18 and younger) with disabilities in basic education. It resulted in greater enrolment rates for children with disabilities in partner schools as well as significant progress in learning outcomes, particularly benefiting children with disabilities and special education needs. Yet, children with special education needs had lower pass rates than other children. Data collected in the study were sex disaggregated, and girls were found to be achieving as well as boys across all the Inclusive Education schools (Clarke & Sawyer, 2014).

¹⁸ Despite the age of this review, it is worth including because other cross-national reviews do not include countries in the East Asia and Pacific region.



Well-intended policies aiming for more disability-inclusive education can have negative impacts on learning if the approach is not upheld within the implementation of policies. For example, in Malaysia, despite progressive policies, there has been a heavy and expanding reliance on special schools for children with disabilities, where they receive services based on a categorization of 'educable' or 'uneducable' self-care abilities, which is incongruent with inclusive ideals supporting learner diversity (Chong, 2016). Teachers have tended not to see the benefits of inclusive education (Bailey et al., 2015).

There has been limited – scarce – research on the impact of various types of inclusive education approaches on children with disabilities learning outcomes (UNICEF, 2020b).



AREA 3: TARGETED LEARNING INTERVENTIONS FOR CHILDREN FALLING BEHIND

SUMMARY OF MESSAGES

- Well-designed multilingual education programmes consistently report positive impacts on student learning and increased equity in education.
- Remedial education programmes show strong evidence of effectiveness and could prevent a strong option for supporting learning recovery post-COVID-19 school closures.
- Some evidence exists that computer-assisted remedial learning programmes have a positive impact on learning.
- Adaptive and accessible education programmes for children with disabilities are important.
- Merit-based scholarships have strong potential for boosting learning outcomes among disadvantaged groups.
- Multigrade teaching environments in low- and middle-income countries seem to produce positive results in learning outcomes when implemented well, according to evidence. And poorly functioning multigrade classrooms may hinder learning.



3.4 Measuring learning outcomes and applying data to policies and planning (area 4)

Assessment and monitoring of learning outcomes are critical pillars of effective education systems and for ensuring successful curricula reforms. Data on student learning have become the centre of SDG 4 for tracking progress in the quality of learning outcomes in educational systems.

Education ministries, teachers and schools should rely heavily on education data and assessments when developing, planning and implementing policy reforms. However, in many countries in East Asia and the Pacific, data from national and international assessments are underutilized and/or not effectively applied to policy discussions and reforms for addressing issues regarding learning in early grades and particularly for marginalized children. This is largely because countries are often limited by their technical ability and financial resources in using data from learning assessment programmes to effectively carry out analysis and fully utilize the results (UNESCO, 2017a).

Sometimes, there are too many uncoordinated initiatives on the basis of external resources, which delay the institutional time to use data. To be effective in improving education quality and learning outcomes, learning assessment systems need to be regularly reviewed and constantly improved. To strengthen the capacity of learning assessment systems in partner countries and to promote a holistic measurement of learning, the Global Partnership for Education launched the Assessment for Learning initiative in 2017, with ANLAS as a major component. ANLAS (GPE, 2019) is a comprehensive, qualitative analysis with a focus on three dimensions: context of the national learning assessment system, quality of the assessment programmes administered and the coherence of the assessment system, with regard to the wider education system and other elements within the assessment system.

Some researchers posit that the act of improving the monitoring of learning outcomes, as an intervention in and of itself, can improve learning outcomes. This is particularly interesting to explore at the classroom level. This section of the review looks at evidence on how the tracking of learning has impacted change in children's learning and on education systems in East Asia and the Pacific.

Several promising interventions mapped through the literature review were identified in this programmatic area:

- formative assessment of student learning outcomes (ADB, 2015; Thames & Hayashi, 2018);
- use of high-stake examinations (Burdett, 2017);
- participating in regional, international comparative or large-scale learning assessments (Bergbauer et al., 2018; Tobin et al., 2015); and
- the development of new instruments in each of the three categories of assessments listed above (Aesaert et al., 2014; Boyacı & Atalay, 2016).

Box 18: Scope of area 4: Measuring learning outcomes and applying data to policies and planning

Tracking of learning through stronger assessment systems

Assessment systems can encompass several levels, from in-classroom continuous student assessment to cross-national comparative assessments. Collecting and disseminating data on student outcomes can also be a motivating factor for civil society to engage in advocacy, public accountability or other data-driven initiatives to improve education quality. The following describes three types of assessments.

Formative assessments are those conducted throughout the educational process with a view to enhancing student learning. It implies eliciting evidence about learning to close the gap between current and desired performance (so that action can be taken to close the gap); providing feedback to students; and involving students in the assessment and learning process.

Source: (CCSSO, 2008)

Summative assessments look at learners' achievements at the end of a term, stage, course or programme usually, although not necessarily. It involves formal testing or examinations. A summative assessment is most commonly used for ranking, grading and/or promoting students and for certification purposes. Summative assessments can be high stakes, such as being attached to promotion in grades or cycle, or low stakes.

Source: (UNESCO, 2021). Available at: <http://www.ibe.unesco.org/fr/node/12145>.

Large-scale learning assessments of a system provide a snapshot of learning achievement for a given group of students in a given year and in certain domains. They are often categorized as national or cross-national assessments. These large-scale learning assessments are uniform and standardized in content, administration, timing and marking – they are frequently referred to as standardized tests. They can be school- or household-based or curriculum-based. Generally, teachers and schools may have a stake in the outcome while they hold low or no stakes for the test-takers. They are expected to serve a range of uses, including monitoring, accountability, agenda-setting and analysis.

Source: (UNESCO, 2019). Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000369697>.

The impact of improving assessment approaches on students' learning is an underresearched area in East Asia and the Pacific. Thus, limited evidence is available. However, this literature review found that both formative classroom assessment and standardized assessment can have positive impacts on children's learning. This may be particularly true in the early grades of primary school.

Formative assessment

Global and regional evidence shows that increasing understanding of individual learners' actual levels of learning improves teaching practices (ADB, 2015). When teachers accurately assess and understand children's ability level in a subject, they are better able to adapt their teaching to that level and improve children's learning outcomes. This is particularly true for children struggling to learn. However, the effects are dependent on appropriate teacher preparation to act on the assessment data. Assessment without a change in pedagogy may result in no change in children's learning.

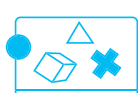
For example, one piece of evidence from a technical assistance programme from the Government of Japan to Pacific Island States indicates that formative classroom-level assessment can help teachers better understand children’s status and thereafter improve learning. The programme, which primarily focused on the Federated States of Micronesia, Marshall Islands, Papua New Guinea, Palau, Tonga and Vanuatu, implemented a variety of assessments, including the Early Grade Literacy Assessments. It then provided training to teachers on how to respond to the assessments through pilot reading programmes that included new literacy material in schools. An evaluation of the programme showed that the use of specific and focused efforts to increase understanding of actual student learning while improving teaching practice created significant positive effects in learning outcomes for children.

Large-scale assessments

In the area of large-scale assessment, evidence from the region shows that participating in international, cross-national or national assessments can have a positive impact on children’s learning. A review of student learning across countries of various income levels in the Asia–Pacific region found that learning assessments likely lead to curricular reforms and changes in performance standards (Tobin et al., 2016), which in turn likely improve learning. Low-performing countries, especially, are likely to be reactive to standardized school-based comparisons, and evidence consistently suggests that introducing such assessments can lead to higher student achievement across the different measures and subjects (Bergbauer et al., 2018).

More directly, another study found that “the expansion of standardized external comparisons, both school-based and student-based, is associated with improvements in student achievement”. The authors of this study built a dataset of more than 2 million students in 59 countries over six waves of the Programme for International Student Assessment student achievement test (2000–2015) and tested a model to investigate reforms in assessment systems over time (Bergbauer et al., 2018). A country’s participation in the assessment was found to increase average student achievement, with a stronger effect for the initially lower-performing countries, but causality was not established. In math, for example, student achievement increased by a 37 per cent SD for the lowest-performing countries (Bergbauer et al., 2018). The positive effect of standardized testing in low-achieving countries appeared to be quite independent of whether the standardized tests were used for external comparison or just for monitoring (Bergbauer et al., 2018). This finding may be oversimplified, however. The relationship between participation in large-scale assessments and improvements in learning outcomes is complex and depends heavily on how countries interpret, use and apply findings.

Although the literature in this review did not usually link assessments or measurement with national education policy changes, evidence from high-income countries reveal that this is possible. Some high-income OECD member States have linked PISA results with a public reflection on education policy, seeking research on experience in other countries and agenda setting of education priorities. Middle-income countries have responded that PISA results are less influential (Lockheed et al., 2015). There is some limited evidence that learning assessments in the Asia–Pacific region led to curricular reforms and changes in performance standards, but links with learning outcomes were not directly made. Learning assessments lead more to curricular reforms and changes in performance standards and are less likely to change resource allocation or teaching and learning policies. The positive effect of standardized testing in low-achieving countries appears to be quite independent of whether the standardized tests are used for external comparison or just for monitoring.



National education data collection has also had limited use for improving student learning achievement. Often, countries require technical and financial assistance to develop the technical capacity and data infrastructure systems (such as education management information systems) to conduct useful quality analyses of learning achievement trends (UNESCO, 2017a). Even the use of school data at the local level requires a strong theory of change and technical capacity to enhance parental and community participation (Read & Atinc, 2017).

High-stakes examinations

The evidence base on the effectiveness of high-stake national examinations in improving children's learning is beginning to shift across the East Asia and Pacific region. The region has long been known for its well-entrenched culture of testing, which determines children's academic and professional trajectory, starting in early primary school (UNESCO, 2017a).

Evidence shows that high-stakes examinations are not an effective tool for improving learning. This is largely because the content tested in examinations is often not effectively linked to the curriculum and the goal is often to rank students based on performance. In most education systems, the function of high-stakes examinations is to filter and control the flow of students between levels rather than to provide evaluative feedback on the performance of the education system for policy purposes. For example, a study on the link between high-stakes examination instruments and expected student outcomes found a large disconnect between what was being assessed and the skills and knowledge needed by learners leaving school (UNESCO, 2017a).

There is also significant evidence that too much high-stakes assessment can have a detrimental impact on children's mental health and learning processes. Many countries in East Asia and Pacific that have already reached a high level of performance in their education systems are moving slowly away from high-stakes examinations.

For example, Singapore, which consistently performs at the top of the PISA rankings, has traditionally had a strong exam culture that pushes children to learn through long hours of study, rigorous exams and public ranking of children's performance. Yet, new reforms focus on reducing the competitiveness of school culture, putting less stress on children and creating space for more rounded twenty-first-century-ready individuals who have stronger soft skills, such as social development, self-awareness and decision-making (Wood, 2018) (see Box 19).

Box 19: Singapore's examination reforms: From exam perfection to well-rounded individuals

Singapore has long been an educational high-achiever, endorsing rote learning and long study hours to propel school children towards exam success. But change is in the air as the island State rethinks its approach to education. "Learning is not a competition," stated Ong Ye Kung, Singapore's Education Minister. The Ministry of Education is planning a series of changes aimed at discouraging comparisons between student performance and encouraging individuals to concentrate on their own learning development.

Shifting the focus away from exam perfection towards creating more rounded individuals represents a serious change of direction for Singapore. The new policies aim to foster social development among pupils to raise self-awareness and build decision-making skills alongside academic performance. Classroom behaviour and practice is being brought into line with local workplace needs as the island State prepares pupils to work in its growing service sector.

- Discussions, homework and quizzes are set to replace marks and grades as the preferred method of collecting information on the performance of young primary school pupils.
- Starting in 2019, exams for Grade 1 and 2 students were abolished. Older primary and secondary students now study in a less competitive environment.
- Marks for each subject are rounded off to the nearest whole number – without decimal places – to lower the emphasis on academic success.
- Primary and secondary school report books no longer indicate whether a pupil finishes top or bottom of the class, while subject and group averages, overall total marks and minimum and maximum grades have disappeared.
- School reports do not show underlined or highlighted failing grades or record a pass or fail result at the end of year.
- A series of 'applied learning' programmes are scheduled to be in place by 2023 to bolster personal development and help students acquire real-world skills. The programmes allow school children to dip into expressive topics like drama and sport as well as more industry-focused areas like computers, robotics and electronics.
- The Ministry of Education has assigned a team of career-guidance officials to change existing perceptions and push students' aspirations beyond working in banking, civil service and medicine.

One thing that hasn't changed is the primary school leaving certificate. Taken at age 11 or 12, this stressful make-or-break exam has traditionally served as a route to a high-level government career. There are no plans to change this aspect of the country's education system, which might be a bit concerning.

Source: World Economic Forum, 2019



Development of new instruments

One of the biggest challenges in reforming examination and assessment policies is to match the needs of twenty-first-century societies, economies and curriculum. New instruments are being developed and tested to try and fill the gaps to help teachers and education leaders to assess children's softer skills. These remain innovative initiatives, but there is some promising evidence.

Several studies have focused on the development of instruments or tools that could help measure improvements in the learning environment and inform evidence-based policy development. Many of these instruments focus on measuring twenty-first-century skills or the development of students' digital information and communication skills. Data from these measures can be used by teachers to improve specific skills to overcome digital inequality. One test can highlight ICT competence areas that may need to be addressed by curriculum developers and policymakers.

One example is the ICT Competence Scale for primary school students that was developed in Belgium. It tests the reliability of an instrument developed to measure primary-school pupils' proficiency in digital information processing and communication. The final measure contains 27 items that refer to retrieving and processing digital information and communication with a computer. The research found that the instrument is a valid direct measure of ICT competence and that it is particularly reliable for low and median ability levels. The assessment can be used to obtain standardized measures of primary pupils' ICT competencies; inform teachers and school leaders about the ICT competencies they need to focus on in the class; provide input for professional development; direct curriculum developers and policymakers towards ICT competence areas that may need to be addressed in ICT curricula; and help monitor how well pupils are mastering the ICT curriculum at the system level (Aesaert et al., 2014).

Similarly, the Likert-type Twenty-First Century Learning and Innovation Skills Scale was developed and proven reliable in determining whether primary school students possessed twenty-first-century skills. The 39 items include 20 items related to creativity and innovation skills, 12 to critical thinking and problem-solving skills and seven to cooperation and communication skills (Boyacı & Atalay, 2016).

Such assessment innovations could represent the future of formative and large-scale assessments. There are also many other components to consider for the future of assessments, such as the system and school assessment framework, individual reporting and tracking, the marking system and digital tracking.

One key finding from this section is that more reflection is needed to understand the transformation of findings and implicit actions from learning assessments on student learning outcomes at all levels and over time. Consolidating the institutional, planning and funding components of the national assessment and monitoring policies and mechanisms (central and decentralized) to coordinate priorities are important. It is also important to strengthen systematic monitoring of learning outcomes, the school environment and practices over time for better curriculum alignment, learning and teaching opportunities and targeted interventions. Long-term implementation of relevant national and cross-national representative assessments to track progress over time, grades, targets and sub-groups of children and schools are important as well as the development of new tools to align with twenty-first-century curriculum and learning.



AREA 4: MEASURING LEARNING OUTCOMES AND APPLYING DATA TO POLICIES AND PLANNING

SUMMARY OF MESSAGES

- Formative classroom assessment can have positive impacts on children's learning opportunities when accompanied by improvements in teachers' practices.
- Teachers' increased understanding of students' actual learning levels helps teachers improve students' learning by 'teaching at the right level'.
- Participation in cross-country assessments over time can improve learning if actions and commitments are negotiated further than data reporting and benchmarking.
- Many high-stakes examinations may not have a positive impact on students' learning because examination content is often disconnected from curriculum content and/or accurate indicators of student learning. They also create significant stress that detracts from learning. Reform of examinations may make them more effective.
- High-stakes examinations and selection at the primary school level have a negative impact (stress, demotivation, learning domain narrowed) on equal opportunities to succeed in learning and society.
- There are some promising new instruments being developed that may help countries to better monitor twenty-first-century skills.
- Long-term implementation of relevant national and cross-national representative assessments to track progress over time is important as well as systematic monitoring of learning outcomes to ensure better curriculum alignment, learning and teaching opportunities and targeted interventions.







3.5 Improving teacher quality and performance (area 5)

As highlighted in each of the previous four sections, teachers are at the centre of improving children's learning outcomes. The quality of an education system cannot exceed the quality of its teachers (Mpokosa et al., 2008). Thus, teachers are the essential keystone to improving learning and learning cannot be improved without teachers as partners.

Many global research studies have shown that teachers are the most important factor in children's learning in primary school and decades of investment in the quality of education has aimed to also improve the quality of teachers. This review takes as an assumption that improving teacher quality improves children's learning. It also delves deeper to look at the varying types of efforts that have attempted to improve teacher quality in East Asia and the Pacific and the evidence around their comparative effectiveness in improving children's learning (see Box 20).

One critical finding for this section is that not enough primary research is undertaken to monitor the impact of investments in teacher quality on children's learning. In the review of research on programmes aiming to improve teacher quality, it was determined that despite the millions of dollars spent across the region to improve teacher quality through decades of diverse programming, few primary research studies, monitoring efforts or evaluations have investigated the links between teacher improvement efforts and children's learning. This is largely a result of the well-held assumption that "improving teacher quality will improve students learning". However, as underlined in this review, there are many factors that determine the impact of a teacher training programme on teachers and a whole second set of factors affecting whether or not children learn in improved classroom settings.

In East Asia and Pacific, interventions that seek to improve teacher quality and teacher technical capacity take many shapes and forms. These fall into several groups:

- pre-service teacher training programmes (ADB, 2009);
- in-service teacher training programmes (Acher et al., 2007; Naseer et al., 2010) and include:
 - classroom management techniques (Myriad Research, 2017; UNICEF, 2017);
 - development of non-cognitive skills (Parandekar et al., 2017),
 - targeted programmes focusing on improving teacher pedagogical styles in specific areas, such as enhancing learner-centred approaches (UNICEF, 2016), improving reading instruction in the early grades (Abeberese et al., 2011), improving rural education quality (Jingtao et al., 2010), developing student thinking skills (Abdullah & Osman, 2010); and establishing links to twenty-first-century skills (Facchinetti, 2014);
 - pedagogical innovations, including transforming classrooms by establishing activity centres to help children interactively explore their lessons (Naseer et al., 2010; UNICEF, 2016, 2017);
- teacher motivation tools, such as compensation-related structures and incentives in public schools (de Ree et al., 2015; Mbiti et al., 2019), and other approaches (UNICEF, 2015a); and
- performance appraisal systems or teacher certification programmes (Chang et al., 2013; Ong Kelly et al., 2008).

Box 20: Scope of area 5: Improving teacher quality and performance

Pre-service and in-service teacher development

Teacher development systems are training programmes usually conducted by public or private degree-establishing institutions and can be provided as pre-service (before employment) and/or in-service for established teachers. This latter form can also be referred to as continuing education but does not necessarily include the acquisition of a degree.

Teacher motivation

The scope includes the impact of teacher motivational factors on educational outcomes. It includes teachers' job satisfaction, motivation to stay and advance in the profession and commitment to improve children's learning.

Teacher management

The scope includes the impact of teacher management factors on educational outcomes. It includes the general management of teachers, working conditions, communication, appraisal, promotion, performance, teacher pay and teacher incentives.

What works to improve learning?

A strong teaching force leads to strong learning outcomes, while improving teacher performance improves student learning. But what types of investments in teachers have the greatest impact on student learning? This section looks at evidence from the region on the types of teacher quality interventions that improve student learning outcomes.

Pre-service teacher training

Research evidence directly linking pre-service teacher training and changes in children's learning is limited in the East Asia and Pacific region. Global research underscores that the highest-performing education systems in the world have strong and rigorous pre-service teacher preparation programmes. The strongest pre-service training systems focus on practical teaching experience in classroom settings rather than theory-based content. Teachers who have had the opportunity in their preparation to engage in the actual practices involved in teaching show more significant student gains during their first year of teaching (Boyd et al., 2009; Brinkman et al., 2017).

The most effective pre-service training systems help future teachers to develop skills in diagnosing struggling students, early and accurately, and adapting instruction correspondingly. They want prospective teachers to be confident in drawing from a wide repertoire of innovative pedagogies that are experimental, participatory, image-rich and inquiry-based. Similarly, strong systems prepare teachers with research skills to question the established practices and contribute to the progression of the profession (Schleicher, 2018). Also, pre-service programmes that provide more oversight of student teaching experiences or require a capstone project supply significantly more effective first-year teachers (Boyd et al., 2009).

For example, Singapore has a sophisticated approach to improving the quality of candidates who enter teacher education, choosing students carefully and encouraging them with an important monthly stipend, comparable to graduates in other fields, which makes the profession attractive. New teachers are guided by mentor teachers who have established time to be involved in this

training. Mentor teachers receive specialized training, certification and additional compensation in the salary schedule (Darling-Hammond et al., 2010).

Similarly, Japan's pre-service system includes a practicum year for all beginning teachers, gives them a reduced teaching load and requires them to attend in-school training with guidance teachers twice a week. They receive weekly out-of-school training, including seminars and visits to other schools (Popova et al., 2016).

In-service teacher training programmes

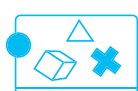
While pre-service teacher training programmes are essential for improving teacher quality and student learning in the medium to long term, significant evidence shows that **quality, structured and targeted in-service teacher training programmes have an immediate positive impact on children's learning**. Teacher training interventions that target a specific pedagogical skill, such as reading instruction, is a promising practice (Macdonald et al., 2017; Mpokosa et al., 2008; OECD, 2009).

Evidence from the region shows that one of the most proven interventions for improving children's learning is early grade reading programmes. All such programmes provide structured training to teachers specifically on delivering instruction in early grade reading and are often accompanied by structured learning materials. For example:

- In **Indonesia**, the Rural and Remote Education Initiative for Papuan Provinces shows significant impact on the most disadvantaged children's learning (see Box 15).
- In **Viet Nam**, the Escuela Nueva programme, which has had a positive impact on cognitive and non-cognitive achievement of children, improved teacher training specifically on how to support the development of non-cognitive skills. It also provides teachers with follow-up support and a professional network for teachers (Parandekar et al., 2017) (see Box 10);
- In the **Tonga** training programme to improve teachers' reading instruction, early grade reading outcomes increased by approximately 0.3 SD. In some reading domains, the assessed impacts were more substantial, ranging from 0.6 to 0.7 SD (Macdonald et al., 2017).
- In **Myanmar**, the School-based In-service Teacher Education Programme improved teacher performance by supporting teachers in moving from theoretical approaches to more practical learner-centred approaches (UNICEF, 2016).

Evidence from South Asia reinforces the finding that structured teacher training shows promising impact on children's learning:

- In **India**, extensive randomized studies have demonstrated that addressing children's current learning gaps rather than following an overambitious uniform curriculum can lead to significant learning gains. Efforts to scale up the NGO Pratham's approach to teaching children according to their actual learning level were evaluated in four Indian states. Although this approach was previously shown to be extremely effective when implemented with community volunteers outside of school, the objective of the scale-up evaluations was to develop a model that could be implemented within the government school system. In one location, teachers received support from government resource persons trained by Pratham and implemented the approach during a dedicated hour. In another, Pratham volunteers implemented high-intensity, short-burst 'learning camps' for 40 days, during school hours, with additional 10-day



summer camps. Both models proved effective, with gains in language of 0.15 SD in Haryana and 0.70 SD in Uttar Pradesh on all students enrolled at the time of the baseline assessment (Banerjee et al., 2016).

- In **Pakistan**, the CRI Program offered structured and systematic training for teachers. Training took place at the start of the academic year with the introduction of the CRI approach, and teachers received technical support throughout the academic year via regular visits by master trainers. The CRI Program was effective in raising learning achievement (Naseer et al., 2010).

The role of **ICT can further enhance teachers' capacities** when they receive appropriate training (Jingtao et al., 2010). Two studies found that teachers' instructional quality can be improved by building an ICT environment and conservation knowledge, respectively. This may especially be the case for learners with disabilities, who might benefit the most from ICT innovations in learning processes. However, for inclusive education to be effective, teachers must be trained and the necessary resources provided.

The COVID-19 pandemic has highlighted the critical importance of teachers' ICT competencies in implementing any pedagogy based on digital platforms. In many countries in the region, teachers' digital competencies are underdeveloped. Any interventions including a digital component must include specific and in-depth training for teachers on its application. According to a recent World Bank study, supporting teachers technologically is integral to ensuring teacher effectiveness in the post-COVID 19 era. They need access to learning materials and digital communication channels as well as assistance to build skills and encouragement for use of digital tools.¹⁹

When schools closed in Malaysia in 2020 due to COVID-19, the Ministry of Education launched an online teaching and learning platform – Komuniti Guru Digital Learning, or Teacher Digital Learning Community. It was established with UNICEF support to equip teachers to lead with the skills and knowledge required to deliver distance classes effectively. The unique features of this programme include prioritizing consultation with teachers, leveraging social media to promote quick uptake, ensuring accessibility and inclusion, providing a menu of technologies, supporting national leadership and building in flexible and interactive learning.²⁰

These findings call for a **shift in the approach** generally taken in regard to teachers' capacity development. Some policy changes in teacher preparedness are also not providing evidence on the impact to student learning. Broad-based teacher training on a wide selection of curricular topics appears less effective in impacting children's learning. Rather, it is more effective to organize shorter, more structured teacher training programmes focused on a specific group of children and specific competencies, namely the competencies that children lack.

Teacher motivation

Several interventions in East Asia and the Pacific have shown marked success with improving children's learning by improving the motivation of teachers. However, understanding what motivates teachers in their daily work is still unclear, making interventions to improve teachers' motivation and children's learning imprecise.

¹⁹ See <http://documents1.worldbank.org/curated/en/331951589903056125/pdf/Three-Principles-to-Support-Teacher-Effectiveness-During-COVID-19.pdf>.

²⁰ See [https://www.corecommitments.unicef.org/covid19db/case-study---malaysia-\(08-july-2020\).pdf](https://www.corecommitments.unicef.org/covid19db/case-study---malaysia-(08-july-2020).pdf).

Motivating in-service teachers by **upgrading their skills** using a certification process has the ability to attract quality candidates to the profession, with possible benefits to student outcomes. A teacher reform initiative in Indonesia worked on teacher upgrading and led to an increase in student learning (Chang et al., 2013).²¹ In India, the lack of teacher training opportunities had the reverse effect (Ganapathi, 2018).

Putting in place clear and transparent teacher appraisal systems is a motivating factor for teachers. In Singapore, the fairness of the performance appraisal system and clarity of appraisal criteria are related to greater teacher satisfaction, more positive attitudes towards performance bonus and higher job satisfaction and motivation (Ong Kelly et al., 2008). In India, according to the World Bank (2017), lack of clear teacher performance benchmarks makes it virtually impossible for the state teacher education system to track the impact of teacher development and management efforts on teacher performance and link teacher evaluations to career development.

Some evidence shows that improving **school leadership** techniques improves teacher motivation. Primary research undertaken in developing countries indicate that the role of head teachers is crucial for improving teacher management and teacher motivation and ultimately for improving learning outcomes for students. The introduction of management training for school leaders has significant impact and should be prioritized (Mpokosa et al., 2008).

Changes in **teachers' compensation** can have strong positive impacts on student learning in some circumstances, but the evidence is not conclusive. Learning outcomes in Pacific Island countries²² have been strongly related to individual earnings, distribution of income and economic growth (AusAid, 2011). These resources, however, need to be complemented with teachers who have had high-quality training, are motivated and who assume accountability for learning outcomes. Yet, in Indonesia, salary increases doubling teachers' pay had no discernible impact on student outcomes nor improvements in teachers' effort (de Ree et al., 2015). Thus, contrary to the predictions of various efficiency wage models of employee behaviour, unconditional increases in salaries of incumbent teachers had no meaningful positive impact on student learning (de Ree et al., 2015). Evaluations occurring in other parts of the world examined the impact of performance-based contracts for teachers on students' learning outcomes, with a specific examination of fixed-wage teachers versus performance pay (Leaver et al., 2019).

Teacher management

Several studies have reiterated global findings about links between teacher motivation, management and supervision with student learning (Capel et al., 2015). The World Bank (2010) argued that effective management of the teaching force is of crucial importance to the development of a national education system. However, investments in teacher deployment systems may not lead to improvements in student learning in the short term.

Teacher deployment systems are important for distributing teachers equitably across a country. But countries often face problems related to teacher motivation. Some teachers are reluctant to teach in remote or rural areas or in areas where other ethnic languages are spoken. In China, a survey of rural primary school teachers, principals and village leaders in the impoverished north-western region examined three measures of job satisfaction: whether teachers perceive teaching to be their ideal profession; whether they want to change profession; and whether they are satisfied with their local education bureau. Teacher motivation was found to be lower in remote, rural areas. The study also found that greater resources and lighter

²¹ The authors suggest that there is much variation in teacher quality that can explain student learning outcomes.

²² Fiji, Kiribati, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu were included in the study.



workloads motivate teaching. Teachers who were socially similar to the local community were happier (Sargent & Hannum, 2005). This implies that boosting teacher motivation in rural and remote areas may be a promising approach for improving children's learning.

For example, evidence shows that **improving the assessment of teachers' practices** can help reduce equity gaps between learners. An international measure of effective teaching, the Classroom Assessment Scoring System, was used in several countries to measure the impact of effective teacher–student interactions on student learning through emotional support, classroom organization and instructional support. Teachers with higher levels of instructional support, as measured by the Classroom Assessment Scoring System, helped reduce the achievement gap between children of mothers with high levels of education and children of mothers with low levels of education. Teachers with higher levels of emotional support helped reduce the achievement gap between children with high functional risk and children with low functional risk in classrooms (Halpin & Kieffer, 2015; Thames & Hayashi, 2018). This type of assessment may help education leaders to select the best teachers for disadvantaged areas. They may also help teacher education programmes to shape their curriculum and reform processes to better equip and allocate teachers.

Systemic reforms that provide teachers with the **flexibility to adapt their pedagogy** to children's needs may be particularly important for boosting learning among children with disabilities and other disadvantaged groups of learners. Curriculum and pedagogy that are highly centralized offer teachers little flexibility when it comes to changing their approaches in the classroom. They require systemic-level change to enable teachers to practise inclusion education for improved student results (Wapling, 2016).



AREA 5: IMPROVING TEACHER QUALITY AND PERFORMANCE

SUMMARY OF MESSAGES

- The evidence clearly supports investments for in-service structured pedagogy approaches that focus on targeted teaching techniques for specific student competencies and specific groups of children.
- Improving the quality of pre-service teacher education is critical to enable improvements in children's learning in the long term. Pre-service programmes that take a practical, hands-on approach and offer teacher mentoring are the most successful.
- Strengthening the ICT environment for teaching may improve children's learning only when teacher's ICT competencies are also upgraded.
- More research is needed to link investments in teachers' professional development to children's learning.
- Improving teacher motivation through certification programmes, improvements in compensation structures, better school leadership and clearer appraisal systems may have a positive impact on students' learning.
- Strong teacher management systems are important for implementing any reforms and ensuring the equitable distribution of teachers. However, links between improving teacher management and children's learning are unclear.





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CONCLUSIONS

Getting foundational learning right is a necessary condition for children to succeed in secondary education, for their future integration into labour markets and as active members of societies. Getting learning right, early on, is the most effective investment that governments and families can make.

The East Asia and Pacific region was already confronting a learning crisis at the start of the COVID-19 pandemic. The spread of the coronavirus, which closed schools for 325 million children across the region, has exacerbated the learning crisis. East Asia and the Pacific, like other regions, now face the challenge of responding to the learning crisis while helping children recover learning loss due to school closures. Understanding how to improve learning for all children, particularly for the lowest performers, from the early grades of primary education in an effective and scalable manner is more critical now than ever before.

This review presents a unique compilation of research evidence from the East Asia and Pacific region (and beyond) on five broad programmatic areas of interest for education policymakers and stakeholders – early childhood transitions; quality of learning environments; targeted remedial learning interventions; learning assessment; and teacher quality and performance.

The review focuses on identifying strategies that have been effective in improving foundational literacy and numeracy outcomes for primary school children, with the hope of providing guidance and insights to those looking to address learning. With years of educational innovations and experimental policymaking, the region provides many learning opportunities. While some examples from the most developed countries in East Asia and the Pacific are included, this review gathered evidence from other countries in the region as well. This approach sought to fill a gap in the available literature on learning in primary education years in East Asia and the Pacific. The findings detailed in the preceding sections highlight the diversity and range of possible interventions that have had more or less successful outcomes with regards to learning.

Many efforts to improve children’s learning, little evidence on impact...

One of the first findings from this review is that countries, donors and development partners in East Asia and the Pacific have inadequately evaluated the impact of quality education programming on improving children’s learning. There is a widely held assumption that any effort to improve quality, such as teacher training, installing ICT platforms into classrooms or curricula reform, automatically leads to improvement in children’s learning. As found in this review, that assumption is not always true. Many factors can interfere, such as weak programme design, implementation, financing and/or scaling up. Thus, while extensive post-programme monitoring and evaluations show positive impacts on teachers’ capacity and improvements in the classroom environment or learning materials, few studies from the region map their impact on children’s learning. This assumption and lack of measurement could be partly to blame for the learning crisis in East Asia and the Pacific.

... but some important evidence from the region illuminates promising ways forward



Despite the scarcity of learning outcome-focused studies, there are some very promising pieces of evidence from the region. This evidence provides useful reflections on the aspects of reforms, programmes and projects that are most successful in yielding improved children's learning. This section summarizes the key evidence gleaned from the review of relevant studies from East Asia and the Pacific, the broader Asian region and beyond.

The review found that within each of the five areas there are pockets of evidence reflecting success in improving learning outcomes. The synthesis highlights **some strategies that have proven effective in improving learning levels in East Asia and the Pacific**. An important caveat is that each of the following messages represents one piece of evidence from a specific country and context and is not necessarily generalizable to all countries in the region. Nevertheless, these pieces can serve as useful home-grown 'food for thought' for policymakers in the region.

What works to improve learning in East Asia and the Pacific?

Learning opportunities before and at the start of primary education school should be improved.

- 1. Quality early childhood education.** Evidence from East Asia and the Pacific on the impact of improving access and quality to early childhood education is rich, consistent and provides a clear message. In general, increasing the amount of time children spend in early childhood education services increases learning outcomes in primary school – but ONLY when the services are of a minimum quality. This is especially true for children from the most disadvantaged communities. Without quality, early childhood education interventions can lead to null impact or negative impact. In fact, poor-quality early childhood education programme implementation carries big risks of little or negative impact on children, particularly the most disadvantaged. In East Asia and the Pacific, more attention is needed on improving early childhood education school environments, curriculum and teacher skills, particularly with interventions aiming to expand infrastructure and expanding access to the most disadvantaged children.
- 2. Tailored school readiness and catch-up programmes.** In the year before or during the first year of primary school, targeting specific skill gaps can have a positive impact on learning outcomes and can support learners to acquire foundational reading skills needed for primary school. Such programmes can also provide, in the short term, a counterbalance to deprived learning environments (see for example, Nonoyama-Tarumi & Bredenberg, 2009).
- 3. Emotions are critical to learning.** Children learn best when they are comfortable and happy in their environment. Making early childhood education programmes more focused on play and making early childhood education environments culturally inclusive may improve learning outcomes, particularly for the most vulnerable children.
- 4. Quality teacher preparation is critical for attaining increases in learning outcomes.** Teacher quality may be a more important factor than teaching experience, however. Policymakers should not focus solely on hiring teachers with more experience and training but instead address the quality of professional education programmes.

Improvements to the learning environment CAN work to improve learning when designed and implemented effectively.

5. Curricular reforms can improve learning in the medium to long term ONLY when appropriate efforts are made to align reforms with pedagogy and assessment.

Well-implemented curricular reforms, accompanied by reforms in teacher education, can be a dominant driver of improvements in students' learning achievement. Impactful curricula reform begins with changes in the curriculum objectives and expected pedagogic styles. However, to ensure the impact of curricula reform on children's learning, coordination, sufficient teacher training, parallel reforms of assessment systems and an iterative feedback loop on the reform process are required. The impact of curricula reform on learning is stronger when teachers 'own' the curriculum content. Thus, curriculum materials that are adapted to the local context and that engage teachers in their development are more impactful. Reforms that provide teachers the time to model desired skills and students the time to practise applying those skills can be more impactful.

6. Improving the quality, numbers and type of teaching and learning materials in the classroom can have a significant impact on learning outcomes under the right conditions and implementation context.

This is particularly the case in the early grades of primary school. However, the introduction of new teaching learning materials improves learning, especially when the materials target a specific skill set, such as early grade reading or twenty-first-century skills, and when teachers are sufficiently trained to support the use of new materials.

7. Digital innovations to the learning environment can improve learning when specifically targeted and accompanied by appropriate teacher and student digital skills.

Introducing digital technology to classroom environments does not in itself improve learning. However, specific interventions to improve digital skills show impact, while computer-assisted remedial learning programmes have also proven effective in East Asia and the Pacific. Digital innovations may help motivate students to learn. But students may perceive technology to be useful in some subjects more than others and may need guidance deciphering when and how to appropriately use technology. In general, in underresourced contexts, simply providing internet access to learners does not show improvements in learning outcomes.

8. Infrastructural improvements to the learning environment only improve learning under the right conditions and implementation context.

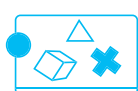
For example, improving water, sanitation and hygiene facilities in underresourced schools can improve learners' participation in school and thus their learning. Improving physical accessibility to schools can provide positive benefits to children's participation in education, particularly for children with disabilities.

Targeted interventions are needed to support inclusive learning for the most marginalized children.

9. Mother tongue and multilingual education programmes are a sure investment.

Well-designed mother tongue and multilingual education programmes report the most consistently positive impacts on student learning and equity in education.

10. Remedial catch-up programmes have a positive impact on student learning outcomes when appropriately targeted. This is especially true when the programmes



are targeted at specific subjects, geographic areas and skills. Computer and ICT-based platforms can enhance remedial learning, especially in rural environments, when accompanied by appropriate training.

- 11. Incentive programmes for students and parents, such as cash transfers and scholarships, can impact children's learning when effectively and consistently implemented.** However, such incentive programmes are more likely to impact children's participation in school rather than learning.
- 12. Multigrade teaching environments in low- and middle-income countries can produce positive results in learning outcomes when implemented well.** However, they require targeted and tailored support to support pedagogy in these schools.
- 13. Universal design for learning interventions can be very effective in boosting learning for all children but particularly for those with disabilities.**²³

More and better monitoring and use of data on learning outcomes are needed to improve learning.

- 14. Improving teachers' formative assessment practices can have positive impacts.** Increased understanding of actual student learning helps teachers to teach at the right level and respond to children's individual needs and thus better improve students' learning. This may be particularly true in the early grades of primary school.
- 15. Participation in cross-country assessments may improve learning.** This can apply particularly among lower-performing countries when data are used effectively to improve policy and practice, although more evidence is needed in this area.
- 16. Investing in robust national learning assessment systems can improve student learning achievement when data are applied effectively to improve policy and practice.** High-stakes examinations, if reformed to be well aligned with curricula and evaluative functions, may add to the intuitive understanding of children's learning performance.

Renewed and innovative approaches to improving teachers' and school leaders' education, career and performance are urgently needed.

- 17. Teachers are the keystone to improving children's learning.** This is not a new finding nor is it surprising. However, evidence from the region shows that despite the well-documented importance of teachers in improving student outcomes, education reforms continue to fail to build in sufficient teacher preparation. And classroom-based interventions continue to fail to prepare teachers for long-term success. Many countries have underestimated the importance of preparing teachers for shifts in a curriculum, materials or assessment system. This review found that extensive and continuous support for teachers is required to make any shift successful at the classroom level.

²³ Assistive technologies include screen readers; robotics; voice recognition; magnification; text-to speech functionality; short message service; instant messaging; telephone relay; video captions; and hands-free navigation and gesture-controlled interfaces. Accessibility enhancements for web browsers promote greater internet use by persons with disabilities. Adaptive technologies involve any object or system that is specifically designed for the purpose of increasing or maintaining the capabilities of people with disabilities. Such disabilities can include visual, cognitive, learning and mobility disabilities.

- 18. Evidence clearly supports investments in in-service structured pedagogy and induction processes** that focus on targeted teaching techniques for specific student competencies and specific groups of children.
- 19. Improving the quality of pre-service teacher education is critical** to enable improvements in children's learning in the long term. Pre-service programmes that take a practical, hands-on approach and offer teacher mentoring are the most successful.
- 20. Improving teacher motivation** through certification programmes, improvements in compensation structures, better school leadership and clearer appraisal systems may have a positive impact on students' learning. However, changing teachers' compensation is not sufficient to improve their motivation and, by possible extension, student learning outcomes.
- 21. Iterative assessments of teachers' practices** can improve student learning when information feeds into targeted improvements in their practices. However, the introduction of solely internal testing and internal teacher monitoring, including inspectorates, does not affect average student achievement.

What matters across all areas of interest?

Contextualization of an intervention has a critical role in determining its impact on children's learning. The literature review found that the implementation of programmes and interventions was frequently considered a barrier to improved learning outcomes. Not taking into consideration local needs and barriers to learning reduced the ability to evaluate the design and quality of interventions. Interventions that consider access and equity barriers in the design phase and address context-based challenges are more likely to have positive results.

Implementation design. Support for a new learning process that is being tested (pedagogy or materials) improves the viability and sustainability of an intervention, with improved impact on learning outcomes. For example, governments should provide teachers with support, training and follow-up to implement classroom-based changes. Implementation design also needs to address issues that could cause the targeted population to not benefit from the intervention. Such barriers could include access, transportation, time-poverty, language and other forms of marginalization.

Measuring equity and impact. The measurement, monitoring and evaluation of programmes and interventions are often a secondary or neglected consideration during the design and implementation phases. Yet, without rigorous findings, the identification of successful practices and programmes is limited. Some were not systematically included in promising programme designs that were initially selected but then excluded from this literature review in the appraisal process. Programmes need to be more sensitive to data disaggregation in studies and evaluations so that findings can provide education policymakers and stakeholders with answers that lead to solutions for learning inequities.



What we still do not know about learning in the East Asia and Pacific region

Countries and education partners in the region still have much to learn.

We need more and better research on learning among marginalized groups of children. There remains a large research agenda to improve policymakers' and practitioners' understanding on learning loss in the region. Little data have been collected on the learning levels and challenges of specific vulnerable populations, such as out-of-school boys and girls, children with disabilities, children from ethnic or minority communities and children displaced due to conflict, natural disasters or migration. These groups are largely excluded from large-scale assessments. Research tools to evaluate learning within these groups are lacking, while more research is needed on the factors linked to improved learning outcomes.

We need more and better research on the factors and interventions that may improve learning outcomes. The East Asia and Pacific region has been the centre of many education programmes and interventions. Yet, evaluations of those interventions do not always make evident their links to learning outcomes. It is often particularly difficult to distil or disentangle interventions' impact from the impact of improved access or participation in school. The review also highlights that many programmes and interventions are not examining the persistence of their **impact over time** and whether long-lasting effects on learning can be determined.

More research is needed on **what motivates teachers** in their daily work so as to improve learning outcomes. Further research in the region is also needed on the distinction between the different types of teacher contract types and their relation to student learning. With regards to the impact of teacher development systems (pre-service and in-service) on learning outcomes in primary education, more evidence needs to be constructed around the approaches that are best suited to country-specific conditions. The research conducted in this review found research gaps that could be the basis for proposals for future research. These are listed here as a starting point for exploration of cross-country sharing:²⁴

- The impact of different factors on the transition to primary school, especially regarding child development outcomes (including socioemotional behaviours) in the short to medium term and especially in developing countries.
- The impact of ICT on learning outcomes in primary education in East Asia and the Pacific and the application of the latest educational technologies.
- Scaling up and adapting existing programmes for successful, local implementation.

Research on the impact of particular assistive and adaptive technologies on the learning outcomes for children with disabilities is scarce globally and not explored in East Asia and the Pacific in particular. This relates also to the need for greater formality and specific frameworks to include children with disabilities in education planning and implementation. Vargas-Baron et al. (2019) reported that programme protocols, regulations, bylaws and standards for inclusive education were most frequently found in only, approximately, one third of the countries in South Asia, while East Asia and Pacific registered much lower rates of use of regulations. A call for a global agenda for inclusive early childhood development and early childhood intervention programmes is recommended.

²⁴ Countries can benefit from cross-country sharing and exchanges. The Practical Education Network and the Center for Education Innovations (<https://educationinnovations.org/>) can provide meaningful global learning opportunities.

We need more research on experimental programmes and promising practices.

One of the primary limitations when conducting a literature review using rigorous selection techniques is that interesting or innovative programmes and interventions might not be reported. Additional research to include such programmes with potential in the region could provide supplementary evidence for education policymakers and stakeholders. This is particularly important in the latest areas of education technologies and their relationship with learner outcomes (see Box 20).

Box 21: Examples of the latest types of education technologies

The latest education technologies have expanded into a broad set of areas, beyond the use of computers in the classroom.

Augmented reality is an enhanced version of reality created by the use of technology to overlay digital information on an image that is viewed through a device (such as a smartphone camera). Augmented reality can help make classes more interactive and allow learners to focus more on practice instead of just theory. It changes the way students interact with the real world, enhances student engagement and makes the learning of their subject content fun.

Virtual reality is the term used to describe a three-dimensional, computer-generated environment that can be explored and interacted with by a person. That person becomes part of a virtual world or is immersed within this environment and, while there, can manipulate objects or perform a series of actions. Virtual reality can transform the way educational content is delivered. It works on the premise of creating a virtual world – real or imagined – and allows users to interact with it. It gives learners a better sense of place. With virtual reality, learners are also inspired to discover for themselves. Students have an opportunity to learn by doing things rather than by reading a book. A lot of students are visual learners – virtual reality is helpful for them.

Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts for the purpose of understanding and optimizing learning and the environments in which it occurs. It can provide students with the opportunity to take control of their own learning, give them a better idea of their current performance in real time and help them to make informed choices about what to study.

Artificial intelligence is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. It enables students to receive more personalized tutoring – the computer sets the perfect pace. And it helps educators identify learning disabilities.

Machine learning is an application of artificial intelligence that provides systems with the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programmes that can access data and use it to learn for themselves. It is able to predict student performance. By 'learning' about each student, the technology can identify weaknesses and suggest ways to improve the instruction, such as with additional practice tests. It can further provide customized learning.



Policy implications

To support the recovery of learning lost due to the COVID-19-related school closures and to improve learning overall, policymakers need to shift their thinking from just improving the quality of education to improving learning. This requires, in some cases, questioning or reevaluating assumptions about the links between investments in quality of education and actual impact on students' learning. The findings of this review provide useful insights for policymakers. The hope is that these findings can trigger reflections at national and subnational levels around ongoing programmes and areas for improvement.

In conclusion, the review leaves five closing messages for policymakers:

1. Increase investments in early learning programmes and school readiness catch-up programmes in the first three years of primary education, and keep quality at the centre of all such investments.
2. Invest more in targeted learning programmes for disadvantaged and excluded children and populations. Make such programmes the 'core business' of primary education departments. Expand investments particularly in mother tongue and multilingual education programmes and early grade reading support programmes, which are proven to have some of the highest returns on learning outcomes.
3. Invest in strategic and systematic monitoring of learning outcomes through better programme evaluations, better-quality national assessment systems and more participation in regional and international learning assessments. Develop new tools to align with twenty-first-century curriculum and learning. Improve the use of such tools for education policy decision-making, sector planning and budgeting.
4. Renew and innovate teacher and school leadership preparation systems and establish clear education and career pathways. Review and improve pre- and in-service training systems. Invest more in structured pedagogy programmes, particularly for teachers of children falling behind. Recruit better-quality candidates for the teaching force. Include formative assessment practices in all teacher preparation systems.
5. Invest in improving and diversifying channels for learning twenty-first-century skills and strengthening digital learning platforms and environments, keeping a strong eye on monitoring and evaluating the results of those interventions on learning, particularly as they relate to COVID-19 remote learning platforms.

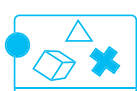
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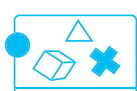
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APPENDICES

Appendix A: East Asia and Pacific countries

East Asia	World Bank income classification (2018)	Pacific	World Bank income classification (2019)
Brunei Darussalam	High	Cook Islands	N/A
Cambodia	Lower middle	Fiji	Upper middle
China	Upper middle	Kiribati	Lower middle
DPR Korea	Low	Marshall Islands	Upper middle
Indonesia	Upper middle	Micronesia, F. S.	Lower middle
Lao PDR	Lower middle	Nauru	High
Malaysia	Upper middle	Niue	N/A
Mongolia	Lower middle	Palau	High
Myanmar	Lower middle	Papua New Guinea	Lower middle
Philippines	Lower middle	Samoa	Upper middle
Thailand	Upper middle	Solomon Islands	Lower middle
Timor-Leste	Lower middle	Tokelau	N/A
Viet Nam	Lower middle	Tonga	Upper middle
		Tuvalu	Upper middle
		Vanuatu	Lower middle

Note: N/A indicates income classification is not available.

Source: (World Bank, 2019)



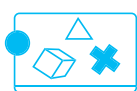
Appendix B: Characteristics of international and regional assessments in primary education in East Asia and Pacific, 2005–2019

	East Asia and Pacific countries	Number of East Asia and Pacific countries	Total number of countries	Cross-country comparison	Years conducted in East Asia and the Pacific	Type	Grades	Subjects assessed	Inclusive adaptations	Disaggregation		
										Gender	Urban Rural	Socio-economic status
EGRA	Cambodia, Indonesia, Lao PDR, Papua New Guinea, Philippines, Timor-Leste, Tonga, Vanuatu, Viet Nam	9	40+	Limited	Since 2015	Sample	1 to 4 (variable)	Reading literacy	No	Yes	Yes	Yes
PASEC	Cambodia, Lao PDR, Viet Nam	3	1	Yes	2011–2012	Beginning and end of year	2 and 5 (usually)	Mathematics, language (Khmer, Lao, Vietnamese)	No	Yes	Yes	Yes
PILNA	Cook Islands, F.S. Micronesia, Kiribati, Marshall Islands, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu	13 (2015)	15 (all years)	No	2012, 2015, 2018	End of year	4 and 6	Literacy, numeracy		Yes	Yes	
PIRLS	Indonesia, Thailand	2	49	Yes	2006, 2011	Sample	4	Literacy	No	Yes	Yes	Yes
TIMSS	Hong Kong (China), Indonesia Malaysia, Philippines Thailand	5	58	Yes	2005, 2011, 2015, 2019	Sample	4 and 8#	Mathematics	No	Yes	Yes	Yes
PISA	China, Hong Kong (China), Indonesia, Macao (China), Malaysia, Philippines, Thailand, Viet Nam	8	90+	Yes	2003, 2006, 2009, 2012, 2015, 2018	Sample test	15-year-olds	Reading, science and mathematics	No	Yes	Yes	Yes
SEA-PLM	Brunei Darussalam, Cambodia, Lao PDR, Malaysia, Myanmar, Philippines, Viet Nam	6	26	Yes	2019		5	Reading, writing, mathematics, global citizenship				

Note: Number of East Asia and Pacific countries and non-East Asia and Pacific countries is for most recent year of completed assessment. Cell is intentionally left blank when information could not be ascertained from existing documentation. Total number of countries are for latest year available, except for EGRA and PISA, which are for all countries over time.

#Only Grade 8 in Malaysia.

Country	Name	Years since 2010	Grades	Subjects	High stakes	Type	Details
Cambodia	Grade 3 National Assessment	2011, 2015	3	Khmer language and mathematics			24.4 per cent of G3 tested could not write a single word on dictation test; 2015 G3 = 87 per cent
Cambodia	Grade 6 National Assessment	2011, 2015	6				2015 G3 = 87 per cent. The overall average corrects of 41 per cent suggests that the average Grade 3 student mathematics achievement is not at the expected (or desired) level
China	National Assessment of Educational Quality	2015-2017		Moral education, language, mathematics, science, sports, health, art		National large-scale student assessment	China Compulsory Education Quality Monitoring Report http://en.moe.gov.cn/News/Top_News/201808/t20180801_344002.html
Fiji	Literacy and Numeracy Assessment	2014	4 and 6			Summative assessment	
Indonesia	Asesmen Kompetensi Siswa Indonesia (AKSI)	2016	4	Sample survey		Reading, mathematics, science, background questionnaire	https://s3-ap-southeast-1.amazonaws.com/dev-rekapin/download/collection/45-Indonesia-National-Assessment-Programme-(INAP).pdf
Indonesia	National Exam (Ujian Nasional, or UN or UNAS)	2017	6	Bahasa Indonesia, mathematics, science		National large-scale student assessment	http://gamli.uis.unesco.org/wp-content/uploads/sites/2/2018/10/GAMLI-5-Session2_Indonesia.pdf
Kiribati	STAKI (Standardized Test of Achievement in Kiribati)	2011, 2015	4 and 6	Numeracy and literacy			http://www.mfed.gov.ki/sites/default/files/2015_per_cent20STAKI_per_cent20National_per_cent20Report_per_cent20v1.0.pdf
Lao PDR	National Assessment of Student Learning Outcomes	2012, 2014, planned 2017	3 (2012); 5 (2006, 2009)	Mathematics and Lao language		Random sample, low stakes	http://nada.uis.unesco.org/nada/en/index.php/catalogue/126
Malaysia	Year Six Aptitude Test (UAT6)	(2013 doc)	6	In Malay, Chinese or Tamil language: 3 sections: thinking skills; problem solving and decision-making skills; interest and inclination	Yes (school selection)	Census	Not curriculum-based; special needs accommodations. Held on last day of UPSR.
Malaysia	Primary School Achievement Test (UPSR)	(2013 doc)	6	Mathematics and science tests (in Malay and English), the English language test, Malay language (writing and comprehension)	Yes	Census	https://www.moe.gov.my/index.php/en/muat-turun/penerbitan-dan-jurnal/terbitan/buku-informasi/1587-quick-facts-2018-malaysia-educational-statistics-1/file https://www.mysumber.com/wp-content/uploads/2017/11/PFSR-2017.pdf



Country	Name	Years since 2010	Grades	Subjects	High stakes	Type	Details
Federated States of Micronesia	National Minimum Competency Test	2018	4 and 6	Language and mathematics		National Large-Scale Student Assessment	http://national.doe.fm/index.php/documents/ndoe-documents
Mongolia		2013	5 (2013 or 2008?)	Mathematics and reading in Mongolian			
Mongolia	National assessments	2014	2 and 6	English reading and mathematics	No	Sample	
Myanmar	Basic education final examination		5		Yes		
Myanmar	Chapter end tests		2, 3, 4, 5				
Philippines	Early Language, Literacy and Numeracy Assessment	-	3	Language literacy, numeracy tested in English, Filipino and 19 mother-tongue languages			
Philippines	National Achievement Tests		6	English, Filipino, science, mathematics, social science			
Thailand	Ordinary National Educational Test	2014	6	Thai language, mathematics, science, social studies, religion and culture, foreign languages		Primary exit exam	Visual impairment accommodations
Viet Nam	National Assessment of Grade 5	2011, 2013, 2014	5	Mathematics and Vietnamese		Primary exit exam	

Appendix C: Selection of national student assessments in primary education in East Asia and the Pacific, 2010 to present

Country	Name	Years since 2010	Grades	Subjects	High stakes	Type	Details
Cambodia	Grade 3 National Assessment	2011, 2015	3	Khmer language and mathematics			24.4 per cent of G3 tested could not write a single word on dictation test; 2015 G3 = 87 per cent
Cambodia	Grade 6 National Assessment	2011, 2015	6				2015 G3 = 87 per cent. The overall average corrects of 41 per cent suggests that the average Grade 3 student mathematics achievement is not at the expected (or desired) level
China	National Assessment of Educational Quality	2015-2017		Moral education, language, mathematics, science, sports, health, art		National large-scale student assessment	China Compulsory Education Quality Monitoring Report http://en.moe.gov.cn/News/Top_News/201808/t20180801_344002.html
Fiji	Literacy and Numeracy Assessment	2014	4 and 6			Summative assessment	
Indonesia	Asesmen Kompetensi Siswa Indonesia (AKSI)	2016	4	Sample survey		Reading, mathematics, science, background questionnaire	https://s3-ap-southeast-1.amazonaws.com/dev-rekapin/download/collection/45-Indonesia-National-Assessment-Programme-(INAP).pdf
Indonesia	National Exam (Ujian Nasional, or UN or UNAS)	2017	6	Bahasa Indonesia, mathematics, science		National large-scale student assessment	http://gaml.uis.unesco.org/wp-content/uploads/sites/2/2018/10/GAML-5-Session2_Indonesia.pdf
Kiribati	STAKI (Standardized Test of Achievement in Kiribati)	2011, 2015	4 and 6	Numeracy and literacy			http://www.mfed.gov.ki/sites/default/files/2015_per_cent20STAKI_per_cent20National_per_cent20Report_per_cent20v1.0.pdf
Lao PDR	National Assessment of Student Learning Outcomes	2012, 2014, planned 2017	3 (2012); 5 (2006, 2009)	Mathematics and Lao language		Random sample, low stakes	http://nada.uis.unesco.org/nada/en/index.php/catalogue/126
Malaysia	Year Six Aptitude Test (UAT6)	(2013 doc)	6	In Malay, Chinese or Tamil language: 3 sections: thinking skills; problem solving and decision-making skills; interest and inclination	Yes (school selection)	Census	Not curriculum-based; special needs accommodations. Held on last day of UPSR.
Malaysia	Primary School Achievement Test (UPSR)	(2013 doc)	6	Mathematics and science tests (in Malay and English), the English language test, Malay language (writing and comprehension)	Yes	Census	https://www.moe.gov.my/index.php/en/muat-turun/penerbitan-dan-jurnal/terbitan/buku-informasi/1587-quick-facts-2018-malaysia-educational-statistics-1/file https://www.mysumber.com/wp-content/uploads/2017/11/PPSR-2017.pdf

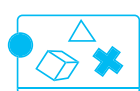


Country	Name	Years since 2010	Grades	Subjects	High stakes	Type	Details
Federated States of Micronesia	National Minimum Competency Test	2018	4 and 6	Language and mathematics		National Large-Scale Student Assessment	http://national.doe.fm/index.php/documents/ndoe-documents
Mongolia		2013	5 (2013 or 2008?)	Mathematics and reading in Mongolian			
Mongolia	National assessments	2014	2 and 6	English reading and mathematics	No	Sample	
Myanmar	Basic education final examination		5		Yes		
Myanmar	Chapter end tests		2, 3, 4, 5				
Philippines	Early Language, Literacy and Numeracy Assessment	-	3	Language literacy, numeracy tested in English, Filipino and 19 mother-tongue languages			
Philippines	National Achievement Tests		6	English, Filipino, science, mathematics, social science			
Thailand	Ordinary National Educational Test	2014	6	Thai language, mathematics, science, social studies, religion and culture, foreign languages		Primary exit exam	Visual impairment accommodations
Viet Nam	National Assessment of Grade 5	2011, 2013 2014	5	Mathematics and Vietnamese		Primary exit exam	

Note: Cell is left intentionally blank when information could not be ascertained from existing documentation. National exams based on external sources, such as EGRA and EGMA, are excluded from this table.

Appendix D: Key words used in search for literature

Categories		Selection of key words used in searches
Cross-cutting groups		
Countries and regional names		Cambodia; China; Cook Is; DPR Korea; Fiji; Indonesia; Kiribati; Lao PDR; Malaysia; Marshall Is; Micronesia, F. S.; Mongolia; Myanmar; Nauru; Niue; Palau; Papua New Guinea; Philippines; Samoa; Solomon Is; Thailand; Timor-Leste; Tokelau; Tonga; Tuvalu; Vanuatu; Viet Nam; East Asia; Pacific Islands; East Asia and Pacific; Southeast Asia.
Education		Learning outcomes; student achievement; student learning; pedagogy; curriculum; primary education; basic education; experiment; pilot.
Vulnerable populations		Poverty; poor households; rural; remote areas; slum; street children; ethnic; minority ethnic/language; pastoralist; nomadic/migrants; OVC (orphans and other vulnerable children); disability; violence; conflict; refugees internally displaced persons; emergency; gender; minority.
Topics of interest		
1	Tracking of learning through stronger assessment systems	Assessment; learning assessment; school examinations; learning measurement; student assessment; monitoring learning; assessment data; national assessments; achievement tests.
2	Early learning and the transition from preschool to primary school	Early childhood; transition; preschool; pre-primary; ECCE; pedagogical continuity; curriculum continuity.
3	Remedial education interventions for low performers at risk of dropping out	Bridge programmes; equivalency; alternative; transition; out-of-school education initiatives; informal primary education; informal basic education; dropout; remedial tutoring; cash transfers; scholarships.
4	Learner- and teacher-focused ICT education platforms	ICT; information technology; communication technology; communications technology; IT.
5	Mother tongue and multilingual education programmes	Bilingual/multilingual education; bilingual/multilingual pedagogy; ethnic language; ethnicity; minority; mother tongue; ethnolinguistic minority; multicultural; language of instruction.
6	Multigrade teaching approaches	Multi-grade; classroom organization; instructional delivery; classroom management techniques.
7	Inclusive education for children with disabilities	Inclusive education; disabilities; disabled; inclusive education.
8	Teacher development systems (pre-service and in-service)	Impact of teacher training in primary education/basic education; impact of teacher development in primary education/basic education.
9	Twenty-first-century skills in the primary school years	Twenty-first-century skills; life skills; transferrable skills; social and emotional skills. Note: The above are common expressions used in the literature (even though it is being interpreted differently in different settings).
10	High-quality teaching and learning materials	Quality teaching and learning materials; quality teaching and learning resources.
11	Curriculum reform	Curriculum and reform; programme and reform; learning levels; pedagogy change; curriculum design.
12	Engagement with the private sector in improving learning	Private partnerships; public-private partnerships; employers and partnerships.
13	Teacher recruitment	Teacher recruitment; contract teachers; community teachers; teacher absenteeism.
14	Teacher management systems	Teacher management; teacher management; teacher motivation; working conditions; morale; communication; appraisal; promotion; performance; teacher pay; teacher incentives.



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