TOWARD MATURE DIGITAL EDUCATION ECOSYSTEMS

THE DIGITAL EDUCATION READINESS FRAMEWORK

SEPTEMBER 2023
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Foreword

In an age defined by digitalization, the process of learning and teaching is being transformed, for the better, by the innovative integration of digital technologies. Recognizing this potential, the Asian Development Bank (ADB) has developed the Digital Education Readiness Framework, a tool designed to evaluate the preparedness of developing member countries to deliver education using digital technology. It aims to provide evidence-based insights that will allow us to bridge the gap between where we are and where we need to be to achieve digital readiness in education.

The initiative seeks to align with ADB’s Strategy 2030, and the solutions shift in the new operating model, elevating ADB’s role as the region’s solutions bank through holistic, innovative, and integrated solutions. It aims to streamline processes and create robust, scalable solutions for digital education readiness assessments, thus reducing resource wastage and fostering more strategic and effective interventions. The initiative also underscores a key issue that we are currently facing: a shortage of data-driven evidence that comprehensively encapsulates the diverse stages of digital educational development within ADB members.

The framework was initially developed by ADB in 2020 as a rapid assessment tool to evaluate the digital readiness of Bangladesh, Cambodia, the Kyrgyz Republic, and Uzbekistan’s education systems. The goal of the four-country study was to develop a standardized tool for key stakeholders to systematically identify gaps and areas requiring further development within the education systems of the ADB members. (*STEM and Education Technology in Bangladesh, Cambodia, the Kyrgyz Republic, and Uzbekistan: A Synthesis Report*). The study served as a key input into developing and testing the holistic framework (DERF), which was then standardized, and expanded to cover a total of ten countries representing all five ADB regional operations.

This report introduces the framework, the corresponding index, and the analytical dashboard for users to quickly compare countries across five core dimensions, the subdimensions, and the 56 supporting indicators.

It is our fervent hope that the insights garnered from this report will aid ADB, its partners, and the governments of ADB members in crafting digital education strategies that are not just in sync with the rapid changes in technology but also align well with their national education priorities. The aspiration is that this initiative will set a new precedent in digital education readiness assessment, enabling economies to transform their educational systems in the digital age.

We invite you to delve into the subsequent pages of this report to gain a greater understanding of DERF and its use cases.

Sungsup Ra
Chief Sector Officer
Sustainable Development and Climate Change Department
Asian Development Bank
Toward Mature Digital Education Ecosystems: The Digital Education Readiness Framework explores the promise of educational technology (EdTech) in scaling access to and enhancing the delivery of education in schools, higher education, and technical and vocational education and training institutions.

Due partially to the recent reduced access to traditional delivery of schooling, developing member countries (DMCs) of the Asian Development Bank (ADB) are increasingly exploring the use of EdTech through ADB projects in these countries. However, its implementation remains limited despite the potential of technology in improving learning outcomes and enhancing employability. A major reason behind the existing gaps between the goals and the actual implementation of EdTech solutions is the lack of a holistic framework for assessing digital learning ecosystems at the country level.

The Digital Education Readiness Framework (DERF) attempts to narrow these gaps by assessing digital education readiness of 10 DMCs across five comprehensive categories examining the following: (i) supporting infrastructure, (ii) national-level policy and/or governance, (iii) readiness of schools and teachers, (iv) readiness of students and parents, and (v) presence of digital education service providers.

By illuminating country-level strengths and weaknesses in readiness, this report will guide ADB and other institutions in directing investments toward the most pressing gap areas and engaging with policymakers to leverage their support. The report’s insights could enable education practitioners and EdTech providers to understand broad trends in their respective areas and better guide their efforts toward achieving more advanced digital education delivery systems.

As the leader of this study, I would like to thank the Economist Impact team who produced the report and collected the data for the DERF indicators for ten countries, deploying a slightly updated version of the ADB DERF. The team included Pooja Chaudhary, project director and education specialist; Anjali Shukla, project manager and Sumer Sharma, lead analyst, with research support from Harsheen Sethi and Saru Gupta.

The visual elements of the report were supported by Ben Hardman, lead designer, and his team.

I also would like to thank ADB colleagues—Per Borjegren, Ryotaro Hayashi, Zhigang Li, Sophea Mar, Mamakalil Razaev, Mamakalil Razaev, Arndt Husar, and Yoonee Jeong, and international education consultants with ADB, Tim Denny and Qobil Yunusov, for providing reviews of the report.

Finally, I want to thank the following experts from the DMCs under study, for their participation in the interview program of this report:
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• Leila Areola, director IV, Bureau of Learning and Delivery, Department of Education, Philippines;
• Munkh Kunj Badarch, digital education specialist, Mongolia;
• Anir Chowdhury, policy advisor, Information and Communication Technology Division, Government of Bangladesh;
• Gulzada Duishebaeva, labor market and industry partnership expert, Kyrgyz Republic;
• Phearoun Phel, deputy director, Department of Information Technology, Ministry of Education, Youth and Sport; Cambodia;
• Hoa Tran Ringrose, country lead for Pakistan and Uzbekistan; Global Partnership for Education;
• Aisulu Sulaimanova, national education officer, United Nations Educational, Scientific and Cultural Organization (UNESCO), Kyrgyz Republic; and
• Ilaria Vanzin, independent consultant, Ministry of Education, Youth and Sport; and former UNESCO officer, Cambodia.

Jian (Jeffrey) Xu
Senior Education Specialist
Sustainable Development and Climate Change Department, ADB
## Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>COVID-19</td>
<td>coronavirus disease</td>
</tr>
<tr>
<td>DepEd</td>
<td>Department of Education</td>
</tr>
<tr>
<td>DERF</td>
<td>Digital Education Readiness Framework</td>
</tr>
<tr>
<td>DICT</td>
<td>Department of Information and Communications Technology</td>
</tr>
<tr>
<td>DMC</td>
<td>developing member country</td>
</tr>
<tr>
<td>EdTech</td>
<td>educational technology</td>
</tr>
<tr>
<td>GNI</td>
<td>gross national income</td>
</tr>
<tr>
<td>GPE</td>
<td>Global Partnership for Education</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communication technology</td>
</tr>
<tr>
<td>IMS</td>
<td>information management system</td>
</tr>
<tr>
<td>IT</td>
<td>information technology</td>
</tr>
<tr>
<td>LMS</td>
<td>learning management system</td>
</tr>
<tr>
<td>MOEYS</td>
<td>Ministry of Education, Youth and Sport</td>
</tr>
<tr>
<td>TVET</td>
<td>technical and vocational education and training</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children's Fund</td>
</tr>
</tbody>
</table>
Executive Summary

The Digital Education Readiness Framework (DERF), developed by Economist Impact, aims to assess readiness for the delivery of education via digital technology among developing member countries (DMCs) of the Asian Development Bank (ADB) across key education subsectors: primary and secondary school education, higher education, and technical and vocational education and training (TVET).

The framework also targets to accomplish the following objectives:

• build on ADB’s existing framework and tools for country situation analysis;
• design modalities to expedite and scale processes toward standardization of digital education country situation analysis;
• deploy scaled delivery of digital education country situation analysis processes to reach 10 DMCs in its first phase: Bangladesh, Cambodia, Fiji, Indonesia, the Kyrgyz Republic, Mongolia, Pakistan, the Philippines, Uzbekistan, and Viet Nam;
• provide a monitoring tool that incorporates time, place, and visualization of data; and
• develop a web-based system that allows regional and cross-country comparisons.

The results will (i) help in creating better alignment of digital education efforts in the region with national priorities in education; (ii) assist ADB, its development partners, and governments in designing interventions aligned with the countries’ digital readiness and strategic focus while preparing digital education interventions for a future of constantly changing technology; and (iii) create a template for scaled delivery of digital education readiness assessment to reduce wastage of resources.

These objectives are in line with ADB’s Strategy 2030, supporting the expansion of social sector interventions and promoting innovative technology as a guiding principle.

Digital Education Readiness Framework: Overview of Framework and Data Methodology

The DERF consists of 56 indicators across five overarching categories and 19 subcategories. The overarching categories include (i) physical and digital infrastructure, (ii) national-level policy and/or governance, (iii) readiness of schools and teachers, (iv) readiness of students and parents, and (v) the presence of digital education service providers. Together, the outcomes of countries based on this five-pillar assessment provide a macroscopic understanding of countries’ digital readiness, combining key enabling inputs (e.g., access to devices) and outputs (e.g., teachers’ use of educational technology [EdTech] in the teaching process). A teachers’ survey was conducted across schools, universities, and TVET institutions in mid-2021 to assess the current utilization of EdTech, understand the challenges in scaling up and mainstreaming digital learning, and steer toward recommendations on future investments in EdTech linked to learning outcomes. The survey results mainly feed into the “Schools and Teachers” and “Students and Parents” categories of the DERF.

The evidence gathered through data collection underpins the calculation of scores for all indicators, with the indicators divided into three types of data sources: (i) secondary research-based qualitative indicators, (ii) survey-based indicators, and (iii) quantitative data-based indicators. All indicators were weighted equally and the final scores were normalized from 0 to 100, where 100 represents the most favorable digital education readiness conditions and 0 the least favorable (Appendix 1 presents the detailed methodology).
To interpret the scores and their implications for where countries lie on the digital readiness spectrum, they have been divided into four bands: initial, emerging, developed, and mature. Each band is defined across each of the five categories (Appendix 2 contains the definitions matrix). Each country’s score at each level of the DERF is also benchmarked against a hypothetical model country, which reflects the best performance possible within each indicator of the framework. The final scores for the model country were calculated by incorporating best and worst possible data thresholds based on available global data from the sources used for the DERF. Inclusion of this model country provides a reference point for assessing how far or close the 10 DMCs are from an ideal level of digital education readiness. The following table summarizes the digital readiness of the DMCs and the model country at the overall and category levels.

### Table: Summary of Scores of Developing Member Countries in the Digital Education Readiness Framework

<table>
<thead>
<tr>
<th>Country</th>
<th>Infrastructure (1)</th>
<th>Government/Policy (2)</th>
<th>Schools and Teachers (3)</th>
<th>Students and Parents (4)</th>
<th>Providers (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model Country</strong></td>
<td>99.8 Mature</td>
<td>98.9 Mature</td>
<td>100.0 Mature</td>
<td>100.0 Mature</td>
<td>100 Mature</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>47.4 Emerging</td>
<td>19.4 Initial</td>
<td>58.3 Emerging</td>
<td>57.3 Emerging</td>
<td>71.3 Emerging</td>
</tr>
<tr>
<td>Cambodia</td>
<td>43.7 Emerging</td>
<td>33.4 Initial</td>
<td>35.2 Emerging</td>
<td>45.1 Emerging</td>
<td>70.9 Emerging</td>
</tr>
<tr>
<td>Fiji</td>
<td>39.8 Emerging</td>
<td>44.3 Emerging</td>
<td>20.4 Initial</td>
<td>44.5 Emerging</td>
<td>73.5 Emerging</td>
</tr>
<tr>
<td>Indonesia</td>
<td>55.1 Emerging</td>
<td>42.4 Emerging</td>
<td>53.7 Emerging</td>
<td>65.4 Emerging</td>
<td>58.7 Emerging</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>43.2 Emerging</td>
<td>48.2 Emerging</td>
<td>27.8 Initial</td>
<td>44.2 Emerging</td>
<td>72.4 Emerging</td>
</tr>
<tr>
<td>Mongolia</td>
<td>41.7 Emerging</td>
<td>53.3 Emerging</td>
<td>20.4 Initial</td>
<td>44.2 Emerging</td>
<td>68.4 Emerging</td>
</tr>
<tr>
<td>Pakistan</td>
<td>38.6 Emerging</td>
<td>36.5 Emerging</td>
<td>24.1 Initial</td>
<td>44.2 Emerging</td>
<td>71.4 Emerging</td>
</tr>
<tr>
<td>Philippines</td>
<td>51.6 Emerging</td>
<td>26.0 Initial</td>
<td>54.6 Emerging</td>
<td>58.1 Emerging</td>
<td>68.8 Emerging</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>59.2 Emerging</td>
<td>59.7 Emerging</td>
<td>85.2 Developed</td>
<td>44.3 Emerging</td>
<td>71.5 Emerging</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>53.1 Emerging</td>
<td>54.9 Emerging</td>
<td>57.4 Emerging</td>
<td>59.0 Emerging</td>
<td>55.5 Emerging</td>
</tr>
</tbody>
</table>

Notes: The table comprises normalized scores constructed from data gathered via secondary research as well as a primary survey of teachers in the primary and secondary schools, higher education, and technical and vocational education and training institutions. An average of 1,000 teachers were surveyed in each of the 10 countries. For the four Asian Development Bank (ADB) project countries—Bangladesh, Cambodia, the Kyrgyz Republic, and Uzbekistan—a part of data on teachers in schools was taken from ADB’s existing survey data. Eight countries (Bangladesh, Cambodia, Fiji, the Kyrgyz Republic, Mongolia, Pakistan, the Philippines, and Uzbekistan) were surveyed between July and August 2021, and two countries (Indonesia and Viet Nam) were surveyed between January and February 2022. More details on the Digital Education Readiness Framework data methodology can be found in Appendix 1.

Key Findings

• None of the 10 DMCs have reached the “developed” or “mature” stage of digital education readiness.
  – At the overall level, all 10 DMCs lie in the “emerging” stage, although they have some variations at the category levels. By implication, these countries largely follow the blended learning model, including a combination of in-person learning and online learning. They partially incorporate flipped learning and project-based learning using technology.
  – Relative to the model country, Uzbekistan is the most prepared country for digital education, followed by Indonesia. The least ready country is Pakistan, followed by Fiji. The figure on p. xi shows the status across the five pillars. Most of the countries’ strengths lie in the capability of teachers and educational institutions to provide digital education (Schools and Teachers category) and the ability of students to adopt it (Students and Parents category). The key areas needing improvement are the private EdTech ecosystem (Providers category), the policy environment for digital education (Government/Policy category), and the adequacy of digital infrastructure (Infrastructure category).
  – The DERF is built on the premise that progress in each of the five pillars is equally critical for a well-functioning digital education ecosystem. But infrastructure and policy are key foundational levers that accelerate progress across other areas. Despite less advancement in these pillars, countries are doing relatively better in terms of digital readiness of schools, teachers, and students. The next finding provides a partial explanation for this—i.e., reliance on low-tech solutions fuels most of this progress.

• All countries lag behind in providing inclusive, affordable, and high-quality digital infrastructure.
  – Bangladesh, Cambodia, and the Philippines perform poorly in terms of access, affordability, and quality of digital infrastructure, while the remaining countries perform moderately. While most countries have high access to urban and rural electricity and low mobile broadband costs, access to the Internet and computer is low. Fixed broadband speeds are low, yet costs are high. These conditions have allowed low-tech digital education delivery, but have held back the transition to more sustainable, scalable, high-tech solutions.

• Barring Uzbekistan, all countries have significant gaps in their policy focus on digital education.
  – The DERF’s results show that four of the 10 DMCs have underdeveloped policy environments for digital education readiness. They are lagging behind on vital parameters such as committing funds for strengthening digital education, providing comprehensive learning and information management platforms, and including digital education delivery in the training of teachers.
  – Nevertheless, the coronavirus disease (COVID-19) pandemic underscored the need to accelerate the adoption of digital education in these countries, with evidence suggesting that all governments are, at a minimum, providing digital content using low-tech media, especially TV and/or radio broadcasting. In relative terms, the strongest policy efforts were directed toward the general education sector (i.e., primary and secondary schools), as compared with higher education and TVET.

• Training teachers in digital education delivery is a catalyst for enabling schools to integrate technology into teaching and learning.
  – A large share of teachers in most countries do not receive training in digital skills covering EdTech use, likely resulting in their high dependence on video calling platforms for education delivery as well as reflecting their limited abilities to self-create advanced teaching content.
  – In a promising finding, however, teachers’ access to devices and mobile broadband at home and at school is relatively high.
  – Teachers in schools face the challenge of receiving inadequate technical support for the use of EdTech. Moreover, teachers at all three levels do not have formal platforms to facilitate knowledge sharing and community creation (except in Bangladesh, Indonesia, the Philippines, and Viet Nam).

• Students across all countries have reasonable digital skills, but face EdTech access and quality issues.
Executive Summary

Despite the DERF results showing that most of the students across the 10 DMCs have not received training in EdTech, students have acquired reasonably high digital competency via self-learning. However, access to devices most suitable for remote learning, such as laptops and computers, is low.

Transitional from improvised arrangements (such as relying on mobile phones for learning and on social media channels for communication with teachers) to longer-term, high-tech solutions is the next step for preparing students and teachers for digital education across all countries.

- Except for Indonesia, the potential of private digital education service providers remains largely untapped across countries.
- According to the DERF results, the most significant gap in digital education readiness is found in the status of the private EdTech ecosystem (also shown in the figure below).

In the Providers category, six of the 10 DMCs are at the “initial” stage of readiness, while the remaining four DMCs are at the “emerging” stage. With the exception of Indonesia, the use of privately owned EdTech platforms for teaching and communicating with students is low across countries, as is the proliferation of privately designed digital learning content.

- While the private sector’s footprint is small, digital education ecosystems of most countries have been aided by the ongoing participation of multilateral organizations partnering with governments for providing digital content and learning platforms, and expanding access to devices and Internet connectivity.

- The COVID-19 pandemic was instrumental in pushing countries into the “emerging” stage of digital education readiness, as teachers and students alike undertook significant amounts of self-learning to adapt to their constrained educational environments.

Figure: Category-Level Scores Across 10 Developing Member Countries

continued on next page
Figure continued

The transformative role of technology in education was highlighted during the coronavirus disease (COVID-19) pandemic, when existing inequities in access to education led to significant learning losses for students, particularly in developing countries. Rather than prescribing one type of education delivery modality, the crisis made it evident that education systems need to be flexible and that delivery via educational technology (EdTech) is one of the central ways to achieve this adaptability.

According to the World Bank, many countries envision a dual role for digitally delivered education: as an “insurance policy” in a world increasingly plagued by climate change–induced uncertainties, and as a medium to close the educational access divide.¹ Beyond access and insurance, EdTech, in and of itself, has several benefits for a learner, including enabling personalized learning and greater engagement with content due to interactivity and proximity to the real world through project-based learning.²

Introduction

A group of learners using personal computers and wearing headphones. Devices play an important role in enhancing classroom learning (photo by ADB).

Against this backdrop, the Digital Education Readiness Framework (DERF) would be an excellent tool. The DERF is a data-driven assessment framework for assessing strengths and gaps in national-level digital education readiness of the 10 developing member countries (DMCs) of the Asian Development Bank (ADB). These DMCs include Bangladesh, Cambodia, Fiji, Indonesia, the Kyrgyz Republic, Mongolia, Pakistan, the Philippines, Uzbekistan, and Viet Nam. Figure 1 summarizes the five pillars and underlying subcategories of the DERF, which were conceptualized through a literature review and consultation with ADB team members, building upon past work undertaken by ADB to assess the maturity of digital education systems in some of its members (Appendix 3 provides the complete framework including indicator definitions, scoring guidelines, and data sources).

The scope of the dimensions being assessed as part of digital education readiness across the five pillars is enumerated in Figure 1.\(^3\)

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**Figure 1: Digital Education Readiness Framework Categories and Subcategories**

<table>
<thead>
<tr>
<th>1</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Internet connectivity, usage, and cost</td>
</tr>
<tr>
<td>1.2</td>
<td>ICT devices and hardware</td>
</tr>
<tr>
<td>1.3</td>
<td>Power and electricity</td>
</tr>
<tr>
<td>1.4</td>
<td>Television broadcasting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>Government/Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Policy and funding</td>
</tr>
<tr>
<td>2.2</td>
<td>Curriculum/content delivery and performance management</td>
</tr>
<tr>
<td>2.3</td>
<td>Training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Schools/Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Teacher capacity in EdTech</td>
</tr>
<tr>
<td>3.2</td>
<td>Equipment and software</td>
</tr>
<tr>
<td>3.3</td>
<td>Governance</td>
</tr>
<tr>
<td>3.4</td>
<td>Community support</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Students/Parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Digital capability of students</td>
</tr>
<tr>
<td>4.2</td>
<td>Connectivity and devices at home</td>
</tr>
<tr>
<td>4.3</td>
<td>Online access to curriculum content</td>
</tr>
<tr>
<td>4.4</td>
<td>Communication</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>e-Learning systems</td>
</tr>
<tr>
<td>5.2</td>
<td>Online content</td>
</tr>
<tr>
<td>5.3</td>
<td>Integrators, emerging tech</td>
</tr>
<tr>
<td>5.4</td>
<td>Partners/sponsors</td>
</tr>
</tbody>
</table>

**EdTech = educational technology, ICT = information and communication technology.**


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\(^3\) Data availability was a key consideration in the incorporation of indicators in the DERF. While an attempt has been made to measure digital education readiness as comprehensively as possible, some parameters intended for inclusion had to be omitted because of data availability constraints (e.g., device quality).
Inclusive access to physical and digital infrastructure is a foundational pillar for a successful digital education ecosystem because access to these assets prefaces other key components and processes that need to be in place. The DERF assesses the infrastructure status of a country via four subcategories: (i) Internet connectivity (access, quality, and affordability); (ii) information and communication technology (ICT) devices (access and affordability); (iii) electricity (access); and (iv) TV broadcasting (access).

This pillar assesses the status of a country’s legislative environment including national laws, policies, funding, and plans to support various aspects of digital education. This is measured via three subcategories: (i) policy and/or funding (existence and scope of a formal strategy, evidence of funding for digital education initiatives, and data protection provisions); (ii) curriculum and/or content delivery and performance management (existence of government-provided content and learning platform); and (iii) teacher training (prevalence of government initiatives to provide digital skills training to teachers).

Teachers (via their own digital skills) and institutions (via their physical resources and governance policies) are instrumental in creating a digital-friendly environment for students at all education levels. Teaching and institutional capacities are measured in the following four subcategories: (i) teacher capacity in EdTech (training in digital skills, use of digital platforms in teaching, communication and assessment, self-creation of digital content, and use of EdTech for relatively advanced student activities); (ii) equipment and software (access to and quality of devices); (iii) governance (data collection systems and information technology [IT] support for teachers); and (iv) community support (formal and informal channels for communication and knowledge sharing).

This pillar assesses the quality of the home, as well as the institutional and community environment for facilitating the achievement of student learning outcomes. Performance in this pillar is itself an outcome of the progress achieved across other pillars of the DERF.

Student outcomes are assessed via the following four subcategories: (i) digital capability of students (level of digital skills and student training in digital skills and data protection); (ii) connectivity and devices at home (access to and quality of Internet and devices); (iii) online access to curriculum content (quality of access to curricular content); and (iv) communication (availability of communication channels between students, parents, and teachers).

Private digital education service providers and multilateral entities are key stakeholders in the digital education ecosystem because they provide crucial support to governments and educational institutions where there may be gaps—e.g., subject matter expertise, technical know-how, and added resources.

The extent of private and multilateral participation is measured via the following four subcategories: (i) e-learning systems (use by teachers), (ii) online content (use by teachers), (iii) integrators and emerging technology (share of ICT-educated workforce), and (iv) partners and sponsors (existence of formal partnerships between governments and the private and/or multilateral entities).

The following chapters discuss each of the DERF pillars in detail, highlighting key pillar-level findings and analyzing each country’s status across the underlying parameters, while outlining strengths and areas for further progress.
Infrastructure

Introduction

Infrastructure, including physical and information and communication technology (ICT) resources, is pivotal to the integration of digital learning in education. While remote learning received significant impetus in response to the school closures because of the COVID-19 pandemic, actual participation highlighted a stark divide in digital access.

According to a survey of national education responses to COVID-19, jointly conducted by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Children’s Fund (UNICEF), the World Bank, and the Organisation for Economic Co-operation and Development (OECD), approximately one-third of low-income countries reported that existing infrastructural capacities for the deployment of remote learning reached less than 50% of the children in those countries. 

Therefore, for a country to be digitally ready, the inclusive provision of connectivity and devices—and systems that support the functioning of digital infrastructure—is key.

The foremost role of infrastructure in delivering digital education is highlighted in most of the studies, reports, and frameworks reviewed as part of building the DERF. For example, infrastructure is one of the pillars of the European Framework for Digitally-Competent Educational Organisations, a pan-European reference framework developed to measure the digital transformation of educational institutions. In the framework, infrastructure is seen as crucial in “facilitating innovative practices and in extending the boundaries of learning spaces (physical and virtual) in a way that encompasses some or all of the multiple dimensions of openness and flexibility (any individual or group learning anywhere, anytime, using any device, with mentoring provided by anyone).”

The enabling role of infrastructure is also notable in the following: (i) the web-based diagnostic Online Assessment System in Schools (OASIS) tool developed by Learning Possibilities for education stakeholders to assess digital readiness in their respective contexts; (ii) a study around school digital inclusion by Kim, Yi, and Hong (2021); and (iii) the World Bank’s EdTech Readiness Index.

Key Findings from the Digital Education Readiness Framework

The DERF assesses the digital and physical infrastructure status of a country via four subcategories: Internet connectivity, ICT devices, electricity, and TV broadcasting. Table 1 summarizes the indicators and findings under each of these subcategories.
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<th>Indicator</th>
<th>Definition/Reasoning</th>
<th>Summary of Findings</th>
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<tr>
<td><strong>1: Internet Connectivity, Usage, and Cost</strong></td>
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<tr>
<td>1.1.1 Internet users</td>
<td>Access to the Internet is measured via the share of Internet users in the country.</td>
<td>• There is some variation in the Internet use, with five developing member countries (DMCs) having a penetration rate of less than 50% (Bangladesh, the Kyrgyz Republic, Mongolia, Pakistan, and the Philippines). • Uzbekistan comes closest to the model country, with a usage rate of 93.5%, against 99.8% for the model country.</td>
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<tr>
<td>1.1.2 Average fixed broadband Internet upload speed</td>
<td>The quality of the Internet is measured using fixed broadband and mobile broadband speed metrics, specifically upload and download speeds.</td>
<td>• All DMCs have below-par fixed broadband speeds, with the score difference between the country with the highest speeds, i.e., Viet Nam (77.0 points), and the model country (80.5 points) (on a scale of 0–100), for upload and download speeds. A similar observation can be made for mobile broadband speeds. • The quality of the Internet is also measured via a survey question from the Economist Impact Teachers’ Survey 2021 asking teachers if students’ home Internet connectivity is stable and fast enough for online classes. In most countries, poor connectivity is an issue for some students, while it is seamless for others.</td>
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<tr>
<td>1.1.3 Average fixed broadband Internet download speed</td>
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<tr>
<td>1.1.4 Average mobile Internet upload speed</td>
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<td></td>
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<tr>
<td>1.1.5 Average mobile Internet download speed</td>
<td></td>
<td></td>
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<tr>
<td>1.1.6 Is Internet connectivity in students’ homes stable and fast enough for online classes?</td>
<td>Mobile and fixed line broadband costs are used to measure the affordability of the Internet.</td>
<td>• The 10 DMCs fare quite well in keeping their mobile broadband costs to a low percentage of GNI per capita, but fixed broadband costs differ across the board. While Cambodia, Indonesia, and Pakistan are the least affordable in broadband costs, Bangladesh, Mongolia, and Uzbekistan are the most affordable.</td>
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<tr>
<td>1.1.7 Mobile broadband cost (% of monthly gross national income [GNI] per capita)</td>
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<tr>
<td>1.1.8 Fixed line broadband cost (% of monthly GNI per capita)</td>
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<tr>
<td><strong>2: Information and Communication Technology Devices/Hardware</strong></td>
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<tr>
<td>1.2.1 Cost of Internet-enabled entry-level handset (% of monthly GNI per capita)</td>
<td>The cost of the most basic available Internet-enabled smartphone is used to evaluate the overall device affordability.</td>
<td>• In all but one country (Uzbekistan), this cost is greater than 20% of GNI per capita, with entry-level handsets being the least affordable in the Philippines (46.1% of GNI per capita) and Fiji (42.6%).</td>
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<tr>
<td>1.2.2 Computer users</td>
<td>The availability of devices is measured through the share of computer users in each country.</td>
<td>• No country crosses the 50% share mark when it comes to the percentage of households that have a computer. Uzbekistan, the relative top performer, has a coverage rate of 41.9%, against the model country rate of 98.3%. • When comparing the shares of computer users and Internet users, Bangladesh, Fiji, and Uzbekistan have similar trajectories, with Uzbekistan and Fiji having both high rates of Internet use and computer use, and Bangladesh having low usage. The cases of Cambodia, Indonesia, and Viet Nam are interesting—although they have high Internet penetration, computer use is low, potentially indicating high mobile device use.</td>
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<tr>
<td><strong>3: Power/Electricity</strong></td>
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<tr>
<td>1.3.1 Urban electricity access</td>
<td>Electricity is the most foundational infrastructure for powering a digitally ready education system.</td>
<td>• Most countries perform well on urban electricity access, with 100% or almost 100% of urban households having access to electricity. • The 10 DMCs range between 90% and 100% in rural electricity access. Pakistan lags relatively behind, with 41.3% of rural households having no access to electricity.</td>
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<td>1.3.2 Rural electricity access</td>
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<td><strong>4: Television Broadcasting</strong></td>
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<td>1.4.1 Households with television</td>
<td>TV can serve as a mass disseminator of education, if the country’s Internet connectivity is lagging or is challenged by controllable and/or out-of-control factors.</td>
<td>• With the average share of households with TV being 81.7%, most countries do relatively well on this parameter. • The share of cable TV subscriptions per 1,000 individuals varies between low and moderate in the countries under study. Pakistan has the highest subscription rate among all countries for which data is available.</td>
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<tr>
<td>1.4.2 Television subscriptions</td>
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Country Analysis

In terms of performance on the infrastructure pillar, most of the countries lie in the “emerging” and “initial” stages, implying either medium or low access to and affordability of required infrastructure, including Internet connectivity, ICT devices, and electricity. Figure 2 presents access to devices and connectivity of the 10 DMCs studied versus the model country.

When benchmarking against the model country (with a score of 98.9), the scores of Bangladesh (19.4), the Philippines (26.0), and Cambodia (33.3) diverge the most, implying significant room for progress across most areas (Figure 3). Relatively, Uzbekistan comes the closest to the model country (with a score of 59.7 against 98.9).

Country-specific insights are discussed in the remaining section of this chapter.

Figure 2: Access to Devices and Connectivity

Source: International Telecommunication Union. World Telecommunication/ICT Indicators Database.

Figure 3: Digital Education Readiness Framework—Infrastructure Country Scores

Country-Specific Insights in the Infrastructure Category

**Bangladesh** 19.4
- Bangladesh has one of the lowest rates of computer usage, with just over 5% of households having access. Yet, almost 40% of households are connected to the Internet, indicating higher use of mobile devices.
- The country does relatively well on broadband affordability, but lags behind in mobile and fixed broadband upload speeds.
- Although it has relatively high cable TV subscriptions, its household TV coverage is just over half of the population.
- As per one of the experts interviewed, social media as an education delivery mode is much more interactive than TV and radio in Bangladesh.

**Cambodia** 33.3
- Cambodia has a relatively high share of Internet users (73.6%) but a low share of computer users (8%).
- Among the 10 DMCs, Cambodia has the highest cost of fixed line broadband as well as high cost of an Internet-enabled smartphone.
- The country lags behind in its fixed broadband upload speeds.
- Cambodia has a high electrification rate, with more than 90% of both rural and urban areas covered by electricity.
- As a best practice, an expert noted that despite poor device access, the Government of Cambodia has pioneered the use of diversified platforms including radio, TV, and social media to ensure last mile access.

**Fiji** 44.2
- Nearly 71% of households are connected to the Internet and 31% of households have computers in Fiji.
- In terms of Internet quality evaluated through speeds, Fiji’s mobile broadband speeds are relatively high among the 10 DMCs, but far behind the model country speeds; however, the country’s fixed broadband speeds are very low.
- The bulk of school students have connectivity issues, whereas only some students seemed to face connectivity issues at the university level as well as at the technical and vocational education and training (TVET) level. This might be explained by the greater presence of university and TVET institutions in urban areas.
- Fiji has low scores on cost parameters. For example, the cost of an Internet-enabled smartphone is an estimated 42.6% of gross national income (GNI) per capita. However, Fiji has 100% rural and urban electricity access.

**Indonesia** 42.4
- Over 78% of households in Indonesia are connected to the Internet, but just under 19% have access to computers. TV access is on the higher side at over 88% of households, but there are only 5.7 TV subscriptions per 1,000 persons—i.e., one of the lowest among the 10 DMCs.
- Internet quality measured in terms of upload and download speeds is relatively low in Indonesia—particularly fixed broadband speeds. This is reflected in the survey results, which show that most of the students at the primary and secondary school, higher education, and TVET levels face connectivity troubles.
- Indonesia has room for improvement across most affordability parameters. While the country has one of the lowest average mobile broadband costs (1.3% of monthly GNI per capita), users face high fixed broadband costs (10.9% of monthly GNI per capita), and Internet-enabled entry-level handset costs (37.9% of monthly GNI per capita).
Kyrgyz Republic 48.2

- The Kyrgyz Republic's comparative key strengths are its TV coverage rate, rural electrification, and fixed broadband upload and download speeds. It, however, lags behind in broadband affordability as well as in TV subscriptions coverage, with only 4.7 subscriptions per 1,000 persons.
- Only 12.4% of households have access to a computer. Noting progress on connectivity, however, an expert stated that over 2,000 schools are connected to the Internet and devices. This is the outcome of collaboration with the private partners on the back of the education ministry’s push for ICT integration in education since 2018.

Mongolia 53.2

- Less than half of Mongolia’s households (46.7%) are connected to the Internet and only 30% of households have a computer.
- Mongolia does well on broadband and device affordability parameters, with both mobile and fixed broadband costs being limited to less than 2.0% of GNI per capita.
- Electricity access in both urban and rural areas is high, but fixed line and broadband speeds are low compared to the model country.
- Over 97% of the country’s households have access to a TV, yet cable subscriptions coverage is low at just 11.3 subscriptions per 1,000 persons.
- Commenting on device and connectivity access, an expert stated that the country has over 60% digital penetration and high reliance on smart devices—social media penetration is over 70%. However, since not all students have access to smart devices, fatigue has crept into learning.

Pakistan 36.4

- Pakistan’s major areas for improvement include its low Internet connectivity (just 34.1% of households are connected), low fixed broadband speeds, high fixed line broadband costs, and low rural electricity access. Although the country’s household TV coverage rate is at the lower end, at 62.8%, it surpasses all countries in its cable TV subscriptions coverage (with over 482 subscriptions per 1,000 persons).
- In terms of ICT infrastructure provision efforts, an expert noted that although the government has piloted various federal-level initiatives around school Wi-Fi access, learning management system (LMS) platforms, and fully functional computer labs with IT-trained teachers, there is a lack of countrywide rollout because of the expense involved. Expansion of the Internet connectivity in remote areas also remains a key challenge.

Philippines 26.0

- Except for urban and rural electricity access, the Philippines lags behind on most infrastructural parameters. Just under 18% of households are connected to the Internet. The high cost of an Internet–enabled smartphone (over 46.0% of GNI per capita) weighs down on its performance.
- While almost 80% of households have a TV, cable TV subscriptions coverage is only 25.2 per 1,000 persons. Among the 10 DMCs, the Philippines has relatively high fixed broadband speeds, but is surpassed by the model country by wide margins.
- Noting differential device access among students, an expert stated that the government is aiming to accommodate different learning modalities for education delivery. For some students who have access to the Internet and devices, online learning will be promoted in the coming years. However, for the majority of students without such access, modular distance learning using TV and radio will be adopted.

Uzbekistan 59.7

- Uzbekistan has several strengths in the Infrastructure category. Almost 94% of households are connected to the Internet, and 41% have computers.
- Rural and urban areas have 100% electricity access, and all households have TV. In contrast, there are just four cable TV subscriptions per 1,000 persons.
- Uzbekistan has moderate fixed broadband speeds but low mobile broadband speeds.
- In terms of affordability parameters, Uzbekistan’s cost of Internet–enabled basic smartphones is comparatively the lowest (at 13.0% of monthly GNI per capita), and its fixed line broadband cost is also low.
Viet Nam

- Viet Nam emerges as one of the relative top performers among the 10 DMCs in the Infrastructure category. Its key strengths include high fixed broadband and mobile broadband speeds, high Internet and TV access, and low broadband costs (e.g., average mobile broadband cost is only 1.0% of monthly GNI per capita, and fixed broadband cost is 3.9%). Viet Nam has 100% urban electricity access and 99.1% rural electricity access.
- Two metrics have room for improvement: (i) the average cost of an Internet-enabled entry-level handset is 36.0% of monthly GNI per capita, which needs significant reduction; and (ii) the country also lags behind in computer access, with just 27.4% of the population having access.

Children studying COVID-19 map on a laptop. Computer devices can play an important role in supporting remote learning in developing member countries (photo by ADB).
CHAPTER 2
Government and Policy

Introduction
A favorable policy environment is a crucial supporting factor in getting countries ready for digital education in the long term. At a simple level, it helps in clarifying the intent of the government. For example, earmarking funds for training teachers in adopting digital education may provide the required impetus to the programs and initiatives that follow after.

Most frameworks for assessing the status of digital education preparedness in educational institutions emphasize the role of the government in helping formalize the process of digitizing education through putting in place the right policy mandates. For example, the federal- and state-level regulatory environment is a key input in an adapted version of a framework called the Comprehensive Model for Diagnosing Organizational Systems. This model can be used for assessing capacity and readiness for establishing or expanding online learning. The European Framework for Digitally-Competent Educational Organisations also emphasizes the role of leadership and governance practices in fostering digital education.

Key Findings from the Digital Education Readiness Framework
The DERF assesses the policy environment for digital education in a country through three subcategories: (i) policy and/or funding, (ii) curriculum and/or content delivery and performance management, and (iii) teacher training. Table 2 summarizes the indicators and findings under each of these subcategories.

Country Analysis
The 10 countries lie on a spectrum when looking at their overall performance on the Government/Policy category (Figure 4). Uzbekistan is the only country that lies in the “developed” category of digital education readiness—implying that the government has integrated digital learning in its education policies and plans, curriculum and content delivery performance management, and teacher training.

Bangladesh, Cambodia, Indonesia, the Philippines, and Viet Nam lie in the “emerging” category, whereas Fiji, the Kyrgyz Republic, Mongolia, and Pakistan have the least favorable policy environment. When benchmarking against the model country, Fiji and Mongolia diverge the most (both score 20.4 against 100.0) because of significant gaps across most policy areas.

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## Table 2: Key Findings in the Government and Policy Category

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<td><strong>1: Policy/Funding</strong></td>
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<tr>
<td>2.1.1 Is there a national plan/strategy for educational technology (EdTech) adoption as part of the education policy?</td>
<td>These questions examine whether the introduction and continuation of digital education is part of the formal policy formulation and funding plans of the national government. They also ask if the country has appropriate legal frameworks for safeguarding data generated as part of digital education.</td>
<td>• All 10 developing member countries (DMCs) have a national plan/strategy for EdTech adoption as part of the education policy, but they differ in the extent to which they cover the three key objectives of digitizing the national curriculum, increasing device access for schools, and rolling out a national EdTech Learning Management System (LMS) and/or Information Management System (IMS) platform. The plans of Bangladesh and the Kyrgyz Republic cover all three objectives, whereas Fiji’s and Mongolia’s plans cover only one. • Although all 10 DMCs have documented plans for EdTech adoption/digital education, only a few (Indonesia, the Philippines, Uzbekistan, and Viet Nam) have committed funding for increasing the use of technology in education. • The 10 DMCs present a mixed bag of legal frameworks for protecting data generated through digital learning activities, which would cover private EdTech players. While Bangladesh, the Philippines, and Uzbekistan have laws for data protection that cover personal data generated through online education, the other seven countries either do not have data protection laws, or have laws that do not adequately cover private EdTech players in their scope.</td>
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<td>2.1.2 Is the government providing funding for the use of technology in education?</td>
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<td>2.1.3 Does the country have a data privacy/security law applicable to private EdTech companies?</td>
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<td><strong>2: Curriculum/Content Delivery and Performance Management</strong></td>
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<tr>
<td>2.2.1 Does the government provide digital content for education?</td>
<td>As part of promoting digital learning readiness, this subcategory measures the government’s own role in digitizing the curriculum and the extent to which the country’s official learning platform, if it exists, has matured to the point of being able to collect and analyze students’ performance data and deliver testing online.</td>
<td>• The government provides digital content in all 10 DMCs under study. Forms of provision differ across countries. For example, in Cambodia, digital content and video lessons are uploaded by the government on the YouTube page and website of the Ministry of Education, Youth and Sport. Among its various initiatives, the Government of Pakistan has developed “Open Courseware” that serves as an online repository of course material for university students. • A range of capacities are seen when examining how equipped governments are to collect and analyze students’ performance data and to deliver testing online. While Fiji, the Kyrgyz Republic, and Mongolia do not have LMS and/or IMS platforms, Cambodia, Indonesia, Pakistan, and Viet Nam have, but these systems do not have the requisite capacities. Uzbekistan’s IMS, on the other hand, can collect and analyze students’ performance data as well as allow educators to execute assessments.</td>
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<td>2.2.2 Does the government’s learning and/or information management platform have the capability for education performance measurement?</td>
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<td><strong>3: Teacher Training</strong></td>
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<td>2.3.1 Is the government facilitating and/or conducting training of teachers in digital skills?</td>
<td>This subcategory assessesinstitutional progress in equipping teachers with the necessary training to integrate technology in teaching functions, from conducting classes to performance assessment.</td>
<td>• None of the 10 DMCs have included digital skills and/or education as part of the formal training of teachers, either pre-service or in-service. While Bangladesh, Indonesia, Uzbekistan, and Viet Nam have developed initiatives to train teachers in online education delivery, it is not included in their formal training as yet.</td>
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Country-Specific Insights in the Government and Policy Category

**Bangladesh**

- Bangladesh’s key policy document with respect to digital education adoption is the Education Sector Plan for Bangladesh Fiscal Years 2020/2021–2024/2025, which has five digital education targets: (i) to develop a plan with targets for the further expansion of digital learning; (ii) to examine the plan for curricular synchronization and language adaptation; (iii) to develop ICT-focused criteria for curricular content, pedagogy, teacher skills, and learning assessment; (iv) to foster interministerial collaboration for designing appropriate ICT learning activities and skills development for a job-ready youth; and (v) to strengthen teachers’ Education Management Information System for professional development and management. However, there is no evidence that this training has been formalized as part of the standard teacher training requirements.

**Cambodia**

- The Cambodia Education Response Plan to COVID-19 Pandemic, published by the Ministry of Education, Youth and Sport in 2020, details how the ministry will actively engage in adapting key government departments to a COVID-19 context and incorporate digital education. The plan also details the budget requirements for comprehensively implementing digital education, including funds for providing “teachers with relevant and practical online training to improve their pedagogical skills in relation to continuous learning for themselves and for their students.” But there is no evidence that resources have been allocated in line with the needs outlined in this plan.
• The government has undertaken a number of initiatives to accelerate digital content delivery, including developing a U-learning platform as well as a new dedicated education television channel for remote education delivery.

Fiji  20.4

• Fiji’s Strategic Plan 2019–2023: Education and Cultural Diversity for Empowered and Sustainable Futures for All, published by the Ministry of Education, Heritage and Arts in 2019, does not have a specific focus on digital education. It, however, mentions as a key performance indicator a “report on technology mapping from the perspective of countrywide access and quality available to each school for technology in current curriculum, distribution networks and their capacity, and availability and use of devices in schools for teaching and learning.”

• The latest available budgetary allocations to the country’s education ministry do not indicate any specific commitments to the expansion of digital education.

• The Government of Fiji provides education content through two radio broadcasting channels and its FEMIS LIVE program. FEMIS is the official education management information system of the Ministry of Education, Heritage and Arts, which includes information and resources for schools, teachers, and students.

• A significant gap in the country’s policy environment for digital education readiness is the lack of development of programs and initiatives to train teachers in digital skills and education.

Indonesia  53.7

• Indonesia’s policy environment for digital education presents a mixed bag. It has a national strategy for EdTech adoption in schools as part of the education policy that highlights “strengthening technology as an equitable tool for both remote and large cities to get equal opportunities and support for learning” as a key objective. The implementation efforts are seen in the School Digitization Program that “aims to increase the development of school digitization, especially in frontier, outermost, and disadvantaged regions,” as well as in the National Education Network Program that aims to provide network infrastructure to all educational institutions throughout Indonesia. In 2019, the School Digitization Program reached an estimated 30,227 schools through BOS (School Operational Assistance) affirmations and 6,004 schools through BOS Performance.

• Other key strengths include government provision of digital content for learning, existence of programs and initiatives to train teachers in digital skills and education (not included in formal training), and the existence of a formal platform to facilitate knowledge sharing and community creation among teachers. The Ministry of Education and Culture of Indonesia has launched a co-sharing platform, Guru Berbagi, to support teachers’ practice of online and remote learning methods by encouraging practitioners to share learning implementation plans.

• A key gap is the absence of education performance management capabilities of the country’s learning management platform. Rumah Belajar, the national platform, indicates that it has a question bank for students, but does not provide any further information about how the assessments will be monitored.

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There is no evidence of personalized testing for students on the website. There is also no evidence that the data can be collected for a standard assessment.

**Kyrgyz Republic** 27.8

- There are crucial gaps in the Kyrgyz Republic's policy environment for digital education readiness despite the existence of a comprehensive national plan for EdTech adoption in schools. In terms of the plan, the Education Development Program for 2021–2040 of the Ministry of Education and Science aims to improve the quality of education for the next 20 years through “modernization of the content of education at all its levels and digitalization of education,” among other goals.21
- With respect to increasing device and Internet access, one of the expected indicators and outcomes of this policy is the “national average computer/student ratio,” with the goal of reducing the number of students assigned to a single computer from 28:1 (i.e., 28 students to a computer) in 2020 to 26:1 in 2023. It also aims (i) to provide public schools with Internet, with a speed of at least 10 megabits per second, and local network infrastructure; (ii) to provide schools with digital libraries and classes equipped for the use of electronic training materials; and (iii) to improve the availability of digital complementary teaching materials for basic primary and secondary school subjects.
- Key gaps in the Kyrgyz Republic’s policy environment include the lack of a government LMS and/or information management system (IMS), and training programs for teachers to deliver education online. For example, the country’s Education Development Plan 2012–2020 and its corresponding action plan with set target outcomes mention the development of “an educational portal integrated into (the) existing website (of the) Ministry of Education and Science, which will contain (an) information database of educational institutions of the Kyrgyz Republic, research, innovations, projects, etc., as well as (a) support forum for the exchange of views” and the development of “the concept of education management information system (EMIS), relevant indicators and software.” However, there is no information that this has been implemented.22

**Mongolia** 20.4

- Mongolia has significant room for progress in its policy environment for digital education. The country’s education planning documents do not comprehensively prioritize this goal, and do not include commitments for funding EdTech or broader digital education initiatives.23
- An education expert noted that measures taken during the COVID-19 pandemic to ensure education continuity were largely unplanned, with no standardized online education guidelines. There was only some integration of digital elements in higher education pre-COVID-19.
- The expert also informed that, with the support of ADB prior to the pandemic, the government developed a centralized education management information system, which records information on students. However, it does not have a function to implement online learning.
- A key gap in the policy environment for digital education readiness is the absence of initiatives to train teachers in digital skills and education. While the importance of digital skills training for teachers is stated in the Education Sector Medium-Term Development Plan 2021–2030, published by the Ministry of Education, Culture, Science and Sports in 2020, there is no evidence of implementation of actual programs or initiatives toward this goal.

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Pakistan

- Pakistan’s National Education Policy 2017–2025, published in 2017 by the Ministry of Federal Education and Professional Training, notes the following: (i) provision of access to ICT in schools, (ii) use of ICT to strengthen quality of teaching and enhance student learning, (iii) development of complementary approaches to ICT in education, (iv) building on best practices in existing ICT programs, and (v) development of the capacity of education departments as part of its ICT policy objectives. However, the scope of access to devices is not elaborated in the policy.
- One of the key areas of the policy is the “revision of curriculum and teacher training system, both pre-service and in-service, to make it learner-centered and IT-based.” Nonetheless, there is no mention of a digitized curriculum.
- The government has implemented a number of initiatives—largely as a response to the pandemic—to provide large-scale access to digital content. One such initiative is the “TeleSchool,” which includes “educational programmes broadcasted on television across the country to support distance learning for students from grades 1–12, focusing on Mathematics, English, Urdu, and Science subjects.”

Philippines

- The Philippines has made solid funding commitments for expanding digital education at all levels. The government’s 2021 budget reportedly allocates $206 million for Digital Workforce and Digital Education. A post from the Department of Information and Communications Technology (DICT), dated August 2021, notes that “laptops and gadgets procured by the DICT under its Digital Education Program were intended to assist its partner local government units (LGUs) facilitate ICT-enabled education, especially during the COVID–19 pandemic.”
- Other strengths of the country’s policy environment include the existence of an IMS, which can digitally collect and analyze educational performance data, as well as the provision of digital learning content by the government—although, these efforts, by and large, constitute the country’s COVID–19 response rather than being part of a long-term strategy. For example, the Philippines has developed the UNESCO National Learning Platforms and Tools list through the Department of Education (DepEd), the DepEd Commons, the DepEd Radio, and the DepEd TV Channel. The DepEd Commons is “an online platform for public school teachers to support distance learning modalities to continue the delivery of basic education.” The DepEd Radio broadcasts educational programs on 162 radio stations across the country for all students, whereas the DepEd TV Channel broadcasts educational lessons for all students on 2,017 TV channels across the country.
- A notable key gap is that the country does not have in place programs or initiatives to train teachers in digital skills and education as part of their formal training. The DepEd Commons website provides virtual learning modules for teachers on how to set up virtual classes, taking polls and quizzes online, virtual background and attendance, and grades and class management. However, there is no evidence that these trainings have been formalized.

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Uzbekistan  85.2

- Uzbekistan is at the top of the order among the 10 DMCs when benchmarked against the model country, having relatively the most favorable policy environment for digital education. An expert noted that the Government of Uzbekistan has planned to digitize all schools by 2030.
- The Education Sector Plan of Uzbekistan 2019–2023 includes the use of ICT for pedagogy as one of its key strategic areas and proposes the establishment of a newly planned Agency for the Development and Implementation of ICT in the Public Education System to achieve this. The Education Sector Plan will “aim at progressively connecting all schools to the broadband Internet (not less than 10 megabits per second) and equipping them with modern computer equipment.”
- According to the State Budget of the Republic of Uzbekistan for 2021 (only available in Uzbek), released on 30 December 2020, the Ministry of Public Education has allocated SUM98 billion (approximately $8.9 million) for “the cost of providing public education facilities with broadband Internet access,” out of its total budget of SUM21,987 billion (approximately $1.9 billion).
- The Ministry of Public Education provides digital content for education through its multiple platforms. It uploads video lessons on its elearning repository, maktab.uz, while also making learning content and teaching materials available through online.maktab.uz, Talim.uz, Edu Market, Eduportal, and Kitob.uz.
- The government has developed programs and initiatives to train teachers in digital skills and education. But there is no evidence that it has developed a digital skills and education delivery training curriculum or that the training is incorporated in formal education.

Viet Nam  57.4

- There is relatively strong national-level policy support for digital education in Viet Nam. The government approved the Scheme on Development of Education Society in 2021–2030, aiming to specifically boost IT and digital technology application to increase operational efficiency of tertiary education facilities, vocational training establishments, and others, and developing open education materials to serve lifelong learning on educational TV. The scheme also includes the development of locally made digital learning platforms that shall be used by over 50% of students, along with the development of a national database for at least 50% of the standard online learning materials.
- There is evidence that the government provides digital content for education. The online digital repository is a cooperative product between the Ministry of Education and Training and the government’s Digital Vietnamese Knowledge Project. The platform provides students and teachers resources like textbooks and digital learning materials for different grades. It includes, among textbooks and lesson plans, virtual experiment and simulation software.
- The government has developed programs and initiatives to train teachers in digital skills and education, but it is not included in their formal training. A 2017 plan was issued to implement a project titled “Enhancing the application of ICT in managing and supporting teaching and learning activities and scientific research in order to contribute in improving the quality of education and training during the 2016–2020 period, orientation to 2025.”

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CHAPTER 3

Schools and Teachers

Introduction

Teachers and the institutions at which they teach serve as the bridge linking infrastructural and policy environments with digital education readiness on the ground. Teachers (via their own digital skills) and institutions (via their physical resources and governance policies) are instrumental in creating a digital-friendly environment for students at all education levels.

All frameworks reviewed as part of designing the Digital Education Readiness Framework (DERF) underscore the facilitative role of these inputs. The integration of ICT in teaching and the development of teachers’ digital competencies are highlighted in the Framework for Digitally Mature Schools developed in a 2017 paper by Redep et al. (2017).35

Furthermore, the e-Learning Maturity Model, a framework developed by academic S. Marshall (2013) to self-assess the quality of blended learning in educational institutions, outlines the following teaching staff-related inputs as necessary requirements, among others, to sustain e-learning: (i) design and development support when engaging in e-learning, (ii) pedagogical support and professional development in using e-learning, and (iii) technical support in the handling of electronic materials created by students.36

Key Findings from the Digital Education Readiness Framework

The DERF includes the following subcategories for measuring the digital readiness levels of schools and teachers: (i) teacher capacity in EdTech, (ii) equipment and/or software, (iii) governance, and (iv) community support. Table 3 summarizes the indicators and findings under each of these subcategories.

Country Analysis

The 10 DMCs lie in the “emerging” category when examining their overall performance on the Schools and Teachers category, with the difference between the model country’s normalized score and the highest-scoring country’s score being almost 35 points (Figure 5). In terms of maturity, this implies that teachers have some of the required skills to use digital tools and platforms for teaching or creating content and engaging students in learning activities. Some teachers have access to ICT equipment and software, high-speed Internet, and online communities of practice. Figure 6 presents the proportion of teachers participating in online communities of practice. The data collection systems in educational institutions are largely paper-based.

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**Figure 5: Digital Education Readiness Framework—Schools and Teachers Country Scores**

<table>
<thead>
<tr>
<th>Model Country</th>
<th>Indonesia</th>
<th>Viet Nam</th>
<th>Philippines</th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>Fiji</th>
<th>Uzbekistan</th>
<th>Pakistan</th>
<th>Kyrgyz Republic</th>
<th>Mongolia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scores</td>
<td>100</td>
<td>65.4</td>
<td>59.0</td>
<td>58.1</td>
<td>57.3</td>
<td>45.1</td>
<td>44.5</td>
<td>44.3</td>
<td>44.2</td>
<td>44.2</td>
</tr>
</tbody>
</table>


**Figure 6: Teachers Participating in Online Communities of Practice (%)**

<table>
<thead>
<tr>
<th>Model Country</th>
<th>Schools</th>
<th>Higher education</th>
<th>TVET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viet Nam</td>
<td>61</td>
<td>53</td>
<td>61</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>30</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>Philippines</td>
<td>32</td>
<td>35</td>
<td>24</td>
</tr>
<tr>
<td>Pakistan</td>
<td>25</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>Mongolia</td>
<td>31</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>28</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>Indonesia</td>
<td>68</td>
<td>70</td>
<td>63</td>
</tr>
<tr>
<td>Fiji</td>
<td>29</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Cambodia</td>
<td>29</td>
<td>28</td>
<td>27</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>28</td>
<td>33</td>
<td>35</td>
</tr>
</tbody>
</table>

TVET = technical and vocational education and training.

# Table 3: Key Findings in the Schools and Teachers Category

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition/Reasoning</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Teacher Capacity in Educational Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.1 Have teachers received adequate training in digital skills that covers skills required for educational technology (EdTech)?</td>
<td>This subcategory measures different types of teacher capacities that need to be in place to achieve a digitally empowered learning environment. It covers teacher training in digital skills; teachers’ use of digital platforms to conduct classes, communicate with students, and conduct online assessments; self-creation of learning content; and level of student engagement in creative and research activities via digital media.</td>
<td>• Most teachers across the 10 developing member countries (DMCs) do not receive training in digital skills that covers EdTech use. This potentially explains their high dependence on social media platforms for education delivery. The teachers’ survey results explain this trend: most educators at all levels across countries were found to rely predominantly on social media and/or video calling platforms to both conduct classes and communicate with students (e.g., Facebook, Google Meet, Telegram, WhatsApp, and Zoom).</td>
</tr>
<tr>
<td>3.1.2 Do teachers use digital platforms to conduct classes?</td>
<td></td>
<td>• According to the survey results, a generally high share of teachers in the primary and secondary schools use digital platforms to create assignments, but these most likely involve the use of social media platforms for uploading handwritten or typed assignments. This was similarly the case for university or higher education instructors and technical and vocational education and training (TVET) educators.</td>
</tr>
<tr>
<td>3.1.3 Do teachers use digital platforms to communicate with students (e.g., providing information, updates, class scheduling)?</td>
<td></td>
<td>• While most teachers in the 10 DMCs also self-create learning content using digital tools in addition to government and private-provided resources, this content is largely basic, e.g., creating Word documents and PowerPoint presentations. In terms of advanced content, under 30% of survey respondents, on average (all levels), confirmed that they can create interactive content, and just under 2% can create videos.</td>
</tr>
<tr>
<td>3.1.4 Do teachers use digital platforms for online assessment?</td>
<td></td>
<td></td>
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<tr>
<td>3.1.5 Do teachers engage in creating learning content themselves?</td>
<td></td>
<td></td>
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<tr>
<td>3.1.6 What type of digital content is created by teachers?</td>
<td></td>
<td></td>
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<tr>
<td>3.1.7 Proportion of teachers creating online assessments</td>
<td></td>
<td></td>
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<tr>
<td>3.1.8 Do teachers engage their students in creative activities via digital media?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1.9 Do teachers engage their students in research activities via digital media?</td>
<td></td>
<td></td>
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<tr>
<td>2: Equipment/Software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2.1 Proportion of teachers with access to a computer or laptop at home</td>
<td>This subcategory measures the extent to which teachers have access to different types of devices, both at home and in school. Complementarily, it also measures the extent and quality of Internet access available to teachers at home and in school. Together, these are key components to achieving a seamless digital teaching experience.</td>
<td>• The share of teachers with access to a computer or laptop at home is reasonably high in the 10 DMCs at all levels.</td>
</tr>
<tr>
<td>3.2.2 Proportion of teachers with access to a smartphone at home</td>
<td></td>
<td>• The proportion of teachers with access to a smartphone is generally between 85% and 99% in the 10 DMCs at all levels.</td>
</tr>
<tr>
<td>3.2.3 Proportion of teachers with access to a computer or laptop at school</td>
<td></td>
<td>• Accessibility of mobile Internet in the 10 DMCs at all levels is high. While the share of respondents in the 10 DMCs confirming that they “always” have access to broadband Internet at home is the highest among all responses, these shares moderately differ by level of education. Access to the Internet drops significantly in the primary and secondary schools.</td>
</tr>
<tr>
<td>3.2.4 Is mobile Internet highly accessible to teachers?</td>
<td></td>
<td>• In terms of Internet quality, the aggregate survey numbers show that the Internet in higher education and TVET institutions is suitable, to varying degrees, for advanced-level actions such as downloading audio content/video content/documents). But only over half of the teachers in the primary and secondary schools confirmed being able to do so.</td>
</tr>
<tr>
<td>3.2.5 Is broadband Internet at home highly accessible to teachers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2.6 Is broadband Internet at primary and secondary schools/higher education/TVET institutions highly accessible to teachers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2.7 Are community Internet access points highly accessible to teachers?</td>
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<tr>
<td>3.2.8 What is the quality of Internet access to teachers?</td>
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</tr>
</tbody>
</table>

continued on next page
3: Governance

3.3.1 What system is used to collect and analyze data (e.g., performance data, attendance records) on students and teachers?

This subcategory assesses institution-level support for furthering and sustaining digital education in primary and secondary schools/higher education/TVET institutions.

- In most countries, the primary and secondary schools largely have paper-based systems for collecting and analyzing data on students and teachers. Most of the higher education and TVET institutions have computerized data records, but the staff must manually log these records.
- Teachers at higher education and TVET institutions across most countries confirmed that there is dedicated IT staff to support teachers facing IT issues. In the primary and secondary schools, however, most teachers themselves undertake these IT tasks.

3.3.2 Proportion of teachers that receive information technology (IT) support while delivering education remotely

This subcategory assesses institution-level support for furthering and sustaining digital education in primary and secondary schools/higher education/TVET institutions.

- In most countries, the primary and secondary schools largely have paper-based systems for collecting and analyzing data on students and teachers. Most of the higher education and TVET institutions have computerized data records, but the staff must manually log these records.
- Teachers at higher education and TVET institutions across most countries confirmed that there is dedicated IT staff to support teachers facing IT issues. In the primary and secondary schools, however, most teachers themselves undertake these IT tasks.

4: Community Support

3.4.1 Proportion of teachers that are part of online communities of practice

This subcategory measures the extent to which teachers have formal and nonformal support mechanisms around developing their digital skills and sharing best practices amid the broader teachers’ community.

- In most countries, the share of teachers at all three education levels reporting that they are part of informal online communities of practice is relatively low.
- In terms of formal platforms to facilitate knowledge sharing and community creation among teachers, Bangladesh, Indonesia, the Philippines, and Viet Nam are the only countries among the 10 DMCs that have such a platform.

4.2 Is there a formal platform to facilitate knowledge sharing among teachers?

This subcategory measures the extent to which teachers have formal and nonformal support mechanisms around developing their digital skills and sharing best practices amid the broader teachers’ community.

- In most countries, the share of teachers at all three education levels reporting that they are part of informal online communities of practice is relatively low.
- In terms of formal platforms to facilitate knowledge sharing and community creation among teachers, Bangladesh, Indonesia, the Philippines, and Viet Nam are the only countries among the 10 DMCs that have such a platform.


Country-Specific Insights in the Schools and Teachers Category

Bangladesh 57.3

- In Bangladesh, there is limited evidence that educators across all levels have received ICT skills training that includes skills for delivering education online. This is reflected in the survey results: when asked if they use digital platforms to conduct classes and communicate with students, teachers confirmed relying on social media and/or video calling platforms, rather than digital learning platforms, potentially because of deficient access to EdTech platforms and to training.
- The availability of equipment and connectivity for teachers is relatively high in Bangladesh, but does not cover all teachers. An expert informed that equipping schools with multimedia classrooms was one of the main objectives of the government’s Digital Bangladesh initiative. One of the interventions achieved one multimedia classroom (i.e., a class equipped with the Internet, a projector, and a laptop) in each of the 23,000 secondary schools.
- With respect to institutional support for teachers to implement and sustain digital learning, all teachers at the higher education and TVET institutions reported receiving IT support to troubleshoot issues arising during the teaching process. Conversely, the share of teachers in the primary and secondary schools who confirmed receiving such support is low.
- A key strength of Bangladesh’s progress toward digital learning is the existence of a formal platform to facilitate knowledge sharing and community creation among teachers. The Teachers’ Portal is an online portal where teachers in Bangladesh can store information, develop professional networks, and participate in professional development trainings. The Teachers’ Portal is available for all teachers in general, vocational, and madrassa education systems across the country.37

• As per the survey results, educators at the primary and secondary school, higher education, and TVET levels have not received ICT skills training that includes skills for delivering education online. An expert interviewed confirmed this, mentioning that there is no current focus on training teachers in using EdTech tools—any available training is done on an ad hoc, rather than systematic, basis.
• The surveyed teachers reported that they mainly rely on social media and/or video calling platforms, rather than digital learning platforms, for conducting classes and communicating with students. According to the same interviewed expert, teachers have no formal platform to conduct classes—they simply send out video links.
• A significant proportion of teachers (over 80%) at all levels create learning content themselves, but this is mostly basic in nature.
• Access to devices is generally high among the surveyed teachers.
• Cambodia has significant room for improvement in the availability of peer support for teachers. Less than 30% of teachers at all levels are part of informal communities of practice (mainly social media groups), and there is no publicly available evidence of a formal platform.

- Fiji’s primary and secondary schools, higher education, and TVET teachers reported not having access to ICT skills training covering skills required for delivering education online. As reflected in the survey results across other teacher capacity parameters, most teachers use ad hoc methods, including using video calling platforms, for conducting classes and sharing information and updates with students.
• Survey results show that device accessibility is not a major area of concern for Fiji’s teachers. Over 80% of educators across all levels have access to computers or laptops at home, and all teachers at all levels have this access at their institution.
• In terms of institutional support for teachers to implement and sustain digital learning, all teachers at higher education and TVET institutions reported receiving IT support to troubleshoot issues related to equipment and software. Conversely, only 14% of teachers in the primary and secondary schools confirmed receiving such support, implying suboptimal use of teachers’ time.

A teacher watches over her students during a class activity in Bhutan. The digital infrastructure “gap” deprives many schools of using education technology to deliver enhanced learning experiences for learners (photo by ADB).
Less than half of teachers in the primary and secondary schools and TVET institutions have received ICT skills training geared toward online education delivery, while just over half of higher education teachers have received such training.

Among the surveyed teachers, most primary and secondary school and TVET teachers reported that they mainly rely on social media and/or video calling platforms, rather than digital learning platforms, for conducting classes and communicating with students. A higher share of teachers in higher education, however, use private learning platforms for teaching.

As the survey results show, most teachers in the primary and secondary schools and TVET institutions do not self-create digital learning content—they instead rely on content provided by the government and private platforms. A high share of teachers in higher education, however, create content themselves (including online resources). This content is largely basic in nature (e.g., PowerPoint slides, Word documents, etc.).

Device accessibility among teachers is reasonably high in Indonesia, with access to smartphones being relatively the highest among all devices. Similarly, the share of teachers at all three levels confirming that they “always” have access to mobile broadband is the highest among all responses; the same also holds true for fixed broadband at home and in their institutions.

In terms of Internet quality, teachers at all levels are able to use the Internet for most functions, including browsing videos, consuming audio and video content, and downloading documents. The Internet, however, is less suitable for downloading heavier content including audio clips and videos.

The share of teachers reporting that they receive support with IT-related issues is low—only 23% of teachers in the primary and secondary schools, 12% in higher education, and 24% in TVET institutions reported that they receive such support.

Teacher training in ICT skills is a gap in the Kyrgyz Republic’s digital learning landscape, as reported by an interviewed expert. There is some evidence of efforts to train teachers in ICT skills as a part of the standards for teacher training (the standards are under approval by the education ministry), but there is no evidence that current efforts suffice. The expert also noted that the share of IT specialists in the education sector is low because of inadequate compensation.

Maturity levels in digital teaching are relatively low, as most teachers at the primary and secondary school, higher education, and TVET levels rely on social media and/or video calling platforms, rather than digital learning platforms, for conducting classes and communicating with students.

Device accessibility is generally not an area of concern for the Kyrgyz Republic overall, but outcomes for TVET are relatively poorer, as the survey results show. As reported by an expert, the country’s education ministry has accelerated its efforts to provide Internet connectivity and devices to schools as part of its ICT integration plan since 2018. Over 2,000 schools are connected to the Internet and devices in collaboration with private partners.

In terms of teacher capacity in digital learning, the survey throws up mixed results for Mongolia. Teacher training in ICT skills, with a particular focus on delivering education online, is a gap. Most teachers at the primary and secondary school, higher education, and TVET levels reported that they have not received such training. This is corroborated by an expert who noted that the government needs to plan for capacity training for teachers.

The absence of systematic training seems to directly impact teaching processes. Most of the surveyed teachers reported that they deploy social media and video calling platforms to teach and communicate with students. Since standardized guidelines for digital education and an online learning platform were both not in place pre-COVID-19, the expert informed that teachers resorted to ad hoc means for education continuity during the COVID-19 pandemic, and they are currently fatigued by the lack of clear guidelines.

Device accessibility is reasonably high, but differs slightly by education level. TVET teachers reported having high access to computers or laptops at home and in school, as well as to smartphones.
Nearly 21% of teachers in the primary and secondary schools reported not having access to a computer or laptop at school.

- Availability of community support for teachers to share knowledge and best practices is low in Mongolia, and there is no publicly available evidence of a formal communication platform.

**Pakistan** 44.2

- According to the survey results, there is an absence of teacher training in ICT skills, with a focus on delivering online education. One of the experts interviewed noted that the few training programs that exist focus on training teachers on how to use IT tools, but not so much on creating or delivering content.
- While most teachers confirmed that they also create educational content themselves, the format of the content is largely basic, covering documents and presentations.
- In terms of Internet quality, teachers in schools are able to use the Internet for most functions including browsing videos, consuming audio and video content, and downloading documents. The Internet, however, is less suitable for downloading heavier content, including audio clips and videos. Higher education and TVET teachers reported comparatively high Internet quality for all functions.
- When examining institutional support available to teachers in delivering online education, there is marked room for improvement in schools. Most schools use paper-dependent systems for data collection and analysis. Moreover, most teachers in schools reported not receiving IT support for troubleshooting hardware and software issues. Teachers in higher education and TVET, however, seem to have such support readily available.

**Philippines** 58.1

- In terms of teacher capacity in digital learning, the survey throws up a mixed bag. Teacher training in ICT skills, with a particular focus on delivering education online, is a gap area. Most of the teachers at the primary and secondary school, higher education, and TVET levels reported that they have not received such training. One of the experts interviewed noted that training is largely needs-based, with no formal pre-service training currently provided. However, EdTech is included as a subject in the training syllabus.
- Most teachers deploy social media and video calling platforms to teach and communicate with students, rather than use learning platforms. As for creating assessments online, about 75% of respondents at all three levels confirmed creating them, but these assignments are most likely in the form of handwritten or typed documents uploaded to social media platforms.
- The share of teachers at all three levels confirming that they “always” have access to mobile broadband is the highest among all responses; the same also holds true for fixed broadband at home. Conversely, most teachers in the primary and secondary schools face challenges with accessing fixed broadband at their institution.
- A key strength of the Philippines’ progress toward digital learning readiness is the existence of a formal platform to facilitate knowledge sharing and community creation among teachers. The country’s DepEd launched an online portal called DepEd Commons in 2020, which, among other features, provides a portal for teachers to develop learning plans and monitor activities, and a collaboration portal for co-teachers and certified teachers.38

**Uzbekistan** 44.3

- Uzbekistan’s primary and secondary school, higher education, and TVET teachers reported not having access to ICT skills training, covering skills required for delivering education online. As reflected in the survey results across other teacher capacity parameters, most teachers use ad hoc methods, including video calling platforms, for conducting classes and sharing information and updates with students.
- More than 75% of teachers reported having access to computers or laptops at home, while all of them reportedly have access to these devices in their institution.

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• Internet quality is high overall for all teachers, but is better for higher education and TVET teachers than for teachers in the primary and secondary schools. For higher education and TVET levels, the Internet is suitable for advanced functions such as downloading video and audio content.

• While teachers in the primary and secondary schools reported having mostly paper-based systems for data collection (e.g., attendance records, performance data), computerized systems are used in most of the higher education and TVET institutions, but these also require manually inputting data by staff.

Viet Nam  59.0

• In terms of teacher capacity in digital education in Viet Nam, the survey throws up a mixed bag. Most of the teachers at all three education levels reported not receiving ICT training focused on online education delivery. This potentially explains the reliance on the use of social media-based platforms for teaching and communicating, compared to dedicated learning platforms.

• A key developmental area for teachers at the primary and secondary school and TVET levels is the ability to self-create digital learning content. A majority of teachers in higher education, conversely, are able to create content themselves, using available online resources. This content is largely basic in nature (e.g., PowerPoint slides, Word documents, etc.).

• Device accessibility is reasonably high, particularly of computers or laptops at home and of smartphones. Access drops slightly in educational institutions, with about 35% of teachers reporting that they do not have access to computers or laptops.

• The share of teachers reporting that they receive support with IT-related issues is low, with 24% of teachers in the primary and secondary schools and in higher education, and 27% of teachers in TVET confirming receiving support.

• A key strength in the area of teacher capacity in digital learning is the existence of knowledge sharing and community creation among teachers. All teachers are being mobilized to share learning materials, which has resulted in contributing nearly 5,000 quality e-learning lessons to the Vietnamese Knowledge System and more than 30,000 questions to the bank of multiple-choice questions, helping build a learning society and promoting lifelong learning.39

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CHAPTER 4

Students and Parents

Introduction

The digital capabilities of students and their access to the tools and content required for digital education are not only key pillars of the digital education ecosystem, but are also outcomes in themselves of the progress achieved across other pillars that are a part of the Digital Education Readiness Framework (DERF).

Supportive infrastructure and policies, and strong digital capability among teachers together contribute to the digital readiness of students. These are in addition to the independent contribution of private providers and the facilitative environments provided by caregivers at home. This chapter assesses the status of digital readiness outcomes for students.

Key Findings from the Digital Education Readiness Framework

The DERF includes the following subcategories for measuring the digital readiness levels of students: (i) digital capability of students, (ii) connectivity and devices at home, (iii) online access to curriculum content, and (iv) communication.

The proportion of students with access to a computer or laptop at home for the 10 DMCs is presented in Figure 7. Table 4 summarizes the indicators and findings under each of the subcategories. Most of the indicators under the Students and Parents category have been measured via a survey of teachers at three educational levels: primary and secondary schools, higher education, and TVET.40

ICT classroom with early secondary grade students. ICT literacy of learners need to be improved to enable effective digital education (photo by ADB).

Figure 7: Students’ Access to a Computer or Laptop at Home (%)

- Bangladesh: 39%
- Cambodia: 41%
- Fiji: 41%
- Indonesia: 45%
- Kyrgyz Republic: 43%
- Mongolia: 38%
- Pakistan: 43%
- Philippines: 36%
- Uzbekistan: 39%
- Viet Nam: 34%


40 The survey results relating to the Students and Parents category must be read against the backdrop of the awareness that teachers have provided their perceptions on students’ digital education readiness to the best of their knowledge and estimation. There may be slight divergence from students’ own perceptions and actual outcomes.
Country Analysis

The 10 DMCs lie in the “emerging” category when examining their overall performance in the Students and Parents category, with the difference between the model country’s normalized score and the highest-scoring country’s score being under 30 points (Figure 8). In terms of maturity, this implies that students have the capability to use basic digital tools. Some students have access to ICT devices, digital curriculum content, and communication channels with teachers.

Table 4: Key Findings in the Students and Parents Category

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition/Reasoning</th>
<th>Summary of Findings</th>
</tr>
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<tbody>
<tr>
<td>1: Digital Capability of Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1.1 Level of digital literacy among students</td>
<td>This subcategory measures the extent to which students are equipped with the knowledge and skills needed for uninterrupted learning via the digital mode. It measures readiness holistically by covering not only digital literacy and educational technology use but also their digital safety.</td>
<td>As reported by the surveyed teachers, the digital skills of students across most countries include using communication tools (e.g., e-mail, messaging, and video calling), storing and organizing files on a computer, completing and submitting online assessments, browsing the Internet to find relevant educational content, operating productivity applications (e.g., MS Office suite), and using collaborative online applications and shared folders (e.g., Google Drive and Dropbox). However, teachers reported that students are not familiar with programming languages, the relatively most advanced digital skill as calibrated in the survey.</td>
</tr>
<tr>
<td>4.1.2 Have students been trained to use digital tools required for online education?</td>
<td></td>
<td>When asked if students have been taught or trained to use the digital tools needed for online education by their educational institution, teachers across most countries reported that majority of students did not receive such training, but are instead self-taught.</td>
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<tr>
<td>4.1.3 Do students receive data privacy, ethics, and safety training?</td>
<td></td>
<td>As for the digital safety of students, some variations exist in the number of trainings given to students on data privacy, ethics, and safety. However, no teacher in any of the 10 developing member countries (DMCs) confirmed the provision of the full range of trainings required to achieve a safe digital experience. These trainings include using antivirus/malware programs, managing privacy settings, ethical and socially responsible online behavior (examples of unethical behavior include plagiarism or cheating, impersonation, stealing, unauthorized access to devices or information), protecting sensitive personal data, and protection against cyberbullying and cybercrimes.</td>
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### 2: Connectivity and Devices at Home

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<th>Indicator</th>
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</thead>
</table>
| 4.2.1 Proportion of students with access to a computer or laptop at home | This subcategory measures the extent to which students have access to different types of devices at home. Complementarily, it measures the extent to which students own devices versus having to borrow them for learning. | • All 10 DMCs have significant room for improvement in securing student access to devices for learning.  
• On average, less than half of the students at all three levels—primary and secondary schools, higher education, and technical and vocational education and training (TVET)—have access to a computer or laptop at home. Access is lowest among TVET students in the Kyrgyz Republic (29%).  
• In contrast with computer and/or laptop access, the survey shows that students across all three educational levels in the 10 DMCs have high access to smartphones.  
• Similar to computer and/or laptop access, on average, less than half of the students have access to TV at home.  
• In response to a question on student ownership of digital devices to assess whether lack of ownership hinders learning, teachers across most countries and educational levels reported that most students do not own devices, but there is always a device available to ensure smooth delivery of online education. Mongolia is the only country for which teachers at all levels reported that most students do not own devices and this interferes with their education. In Indonesia, most students reportedly own devices, with ownership being highest at the higher education level. |
| 4.2.2 Proportion of students with access to a smartphone at home |  |  |
| 4.2.3 Proportion of students with access to TV at home |  |  |
| 4.2.4 Do students own digital devices? |  |  |

### 3: Online Access to Curriculum Content

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition/Reasoning</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3.1 Is curriculum content accessible and suitable for use?</td>
<td>This subcategory assesses the quality of the accessibility of digital curriculum content for students.</td>
<td>• Survey results show that the quality of access to digital curriculum content differs by education level. As an overall trend, while the majority of students in the primary and secondary schools and TVET institutions do not face any issues in accessing learning content, students in higher education experience challenges in accessing content (e.g., technical issues, lack of suitability for digital use, lack of quality, etc.). Availability of relevant content (e-books, PDF versions of textbooks, etc.) is not a challenge in any of the DMCs.</td>
</tr>
</tbody>
</table>

### 4: Communication

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition/Reasoning</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.1 Do teachers have online communication channels with students and parents?</td>
<td>This subcategory measures the availability and extent of use of online communication channels between teachers, students, and parents.</td>
<td>• According to the survey findings, all 10 DMCs are progressive in the availability of social media-based communication channels (e.g., messaging platforms like WhatsApp) between teachers and students and/or their parents. At all the three educational levels, the majority of teachers use these channels not just for basic purposes like providing information and administering homework assignments, but also for more advanced functions such as receiving feedback from parents and communicating with them regarding student performance.</td>
</tr>
</tbody>
</table>

Country-Specific Insights in the Students and Parents Category

**Bangladesh** 71.3

- Students at the higher education and TVET levels in Bangladesh have reasonably high digital proficiency, as reported via the teachers’ survey, but this share drops at the primary and secondary school level.
- The relatively lower share of primary and secondary school students who are digitally proficient can be attributed to the absence of the provision of training in using the tools required for digital education: just 7% of teachers in primary and secondary schools reported that students have received such training, and 53% reported that students are self-taught.
- Outcomes for students’ access to devices for learning purposes indicate significant gaps. Less than half of students across all levels have access to a computer or laptop at home. Similarly, survey results indicate low TV access. Additionally, expert insights reveal that education delivery via TV and radio in Bangladesh is less interactive when compared to other devices.
- The majority of students at the primary and secondary school and TVET levels do not face issues accessing curriculum content. But students in higher education are reported to face issues accessing high-quality content (in terms of quality of content display). To a lesser extent, the availability of relevant content is also a challenge for these students.

**Cambodia** 70.9

- Similar to Bangladesh, digital proficiency among students in Cambodia is reasonably high, but is lower among primary and secondary school students compared to higher education and TVET students. A large share of students in higher education and TVET are self-taught in the use of digital tools. Potentially, the impact of self-learning on digital competency may be higher among higher education and TVET students compared to primary and secondary school students.
- Device access at home to ensure unhindered learning is a challenge in Cambodia, as the survey findings show. Less than half of students at the school, higher education, and TVET levels have access to a computer or laptop at home. This is also the case for TV access in the country.
- At the TVET level in Cambodia, 45% of teachers reported that students do not own devices. However, there is always a device handy, which ensures that learning continues uninterrupted.

**Fiji** 73.5

- The majority of students in Fiji are proficient in a wide variety of digital skills, including more basic ones like using communication tools, storing and organizing files, and finding information on the Internet to more advanced ones such as using productivity applications and collaborative tools.
- Device access at home for students is below par: just over 40% of students have access to a computer or laptop at home. Similar proportions are reported for TV access.
- More than 40% of students at the three levels reportedly do not own devices. But they are able to access one when required, such that learning continues uninterrupted.
- The survey respondents confirmed availability of communication channels between the teachers and the parents and/or students for various purposes. The interaction, however, is limited to social media tools—Telegram in particular, as also noted by an expert interviewed.

**Indonesia** 58.7

- As reported via the teachers’ survey, more than half of students in the primary and secondary school, higher education, and TVET levels have been taught or trained by their educational institution in the use of digital tools for learning. A sizable proportion of students are also self-taught. Consequently, students are well-versed with common skills, including using communication tools, completing and submitting online assessments, browsing the Internet, and operating productivity applications.
- Student access to devices is moderate and differs by education level: 45% of primary and secondary school students and 51% of TVET students have access to computers or laptops at home, while
access is relatively higher at the higher education level (70%). While access to smartphones is very high (over 90% at all levels), access to TV is low (between 19% and 27%).

- A key gap in students’ engagement with digital learning is the relatively low quality of accessibility of learning content, with about half of the students in the primary and secondary school and TVET levels encountering challenges in downloading content or running into technical issues accessing it (e.g., incompatible file format).
- Availability of digital communication channels between students and teachers is not a challenge, with social media groups used for basic purposes (like providing information and updates and administering assignments) and for receiving feedback from parents and communicating with them regarding student performance. The use cases differ by educational level, with teachers in higher education mainly using them for providing information and updates, but less for providing and receiving feedback on students, whereas primary and secondary school and TVET teachers use them for both.

**Kyrgyz Republic** 72.4

- As reported via the teachers’ survey, majority of students in the Kyrgyz Republic have not received any training in using the digital tools required for online education. Most of them are self-taught. Nevertheless, students are notably proficient in various digital skills, especially at the higher education and TVET levels. This proficiency, however, is much lower at the primary and secondary school level.
- Digital safety is not holistically taught to students in the Kyrgyz Republic, with teachers at the school and higher education levels confirming that most of the students have received two trainings out of the five listed in the survey. At the TVET level, there are three trainings most commonly received (ethical and socially responsible online behavior, protecting sensitive personal data, and protection against cyberbullying and cybercrime).
- Access to a computer or laptop at home is relatively low in the Kyrgyz Republic, and very low for TVET students. TV access is similarly quite low.

**Mongolia** 68.4

- Students at the primary and secondary school, higher education, and TVET levels in Mongolia have reasonably high digital proficiency, as reported via the teachers’ survey. Except for being familiar with programming languages, the majority of students are able to execute such functions as using communication tools, storing and organizing files on a computer, completing and submitting online assessments, browsing the Internet to find relevant educational content, operating productivity applications, and using collaborative online applications and shared folders. The shares, however, vary by education level.
- There are gaps in device access at home as well as in device ownership of students across all three educational levels. Less than half of students at the primary and secondary school, higher education, and TVET levels reportedly do not have access to a computer or laptop at home.
- Device ownership is also a gap in Mongolia. Teachers across the three levels reported that almost half of their students do not own devices and cannot borrow them, and that this interferes with their learning.

**Pakistan** 71.4

- The majority of students in Pakistan’s primary and secondary schools, higher education, and TVET institutions are reasonably proficient in a variety of digital skills, including more basic ones (like using communication tools, storing and organizing files, and finding information on the Internet) to more advanced ones (such as using productivity applications and collaborative tools).
- The majority of students at all levels are self-taught in using the tools required for digital learning, with the share of teachers in higher education confirming this as being the highest.
- Students’ device access at home is below par: less than half of students at the primary and secondary school, higher education, and TVET levels have access to a computer or laptop at home. In terms of TV access, the survey reflects a similar proportion. On the other hand, smartphone access is high.
Philippines 68.8

- Digital proficiency among students in the Philippines is reasonably high, with most students being self-taught in the use of digital tools required for education. As a result, majority of students are able to execute basic functions.
- The survey findings show that device access at home to ensure unhindered learning is a challenge in the Philippines. Less than 50% of students at the primary and secondary school, higher education, and TVET levels have access to a computer or laptop at home.
- Around 71% of teachers in the primary and secondary schools and 66% of TVET teachers reported that students do not face any issues in accessing the curriculum content. Conversely, content presentation and relevance are vital issues for students in the higher education level.
- Availability of communication channels between students and teachers via digital channels is not a challenge, with social media groups being used for both basic (like providing information or updates and administering assignments) and advanced purposes (such as receiving feedback from parents and communicating with them regarding student performance).

Uzbekistan 71.5

- As reported via the survey, majority of students in Uzbekistan have not received any training in using the digital tools required for online education; most of them are self-taught. Despite this, students are notably proficient in various digital skills, especially at the higher education and TVET levels. This proficiency is much lower at the primary and secondary school level. However, these results must be read in light of the mix of grade levels at which survey respondents teach in school.
- Access to a computer or laptop at home is relatively low among primary and secondary school students and students in higher education, and very low for TVET students. TV access is similarly quite low. On the other hand, most students have access to a smartphone (97% of primary and secondary school, 96% of higher education, and 98% of TVET students).
- Teachers reported ready availability of communication channels with students and parents for various purposes. Most teachers confirm using these channels for a variety of functions, but most commonly for communicating student performance and other concerns with parents, in addition to administering homework assignments.

Viet Nam 55.5

- As reported via the teachers’ survey, over 50% of students in the primary and secondary schools, higher education, and TVET are taught or trained by their educational institution in the use of digital tools for learning. Even so, a sizable proportion of students are also self-taught.
- The majority of students in Viet Nam’s primary and secondary schools, higher education, and TVET institutions are reasonably proficient in commonly used digital skills, including operating communication tools, storing and organizing files on computers or laptops, completing and submitting online assessments, and finding information on the Internet. Proficiency is comparatively highest at the higher education level.
- Digital safety and privacy are not holistically taught to students in Viet Nam, with teachers at the school and higher education levels confirming that most of the students have received just one training out of the five listed in the survey—i.e., ethical and socially responsible online behavior. The share of students receiving this training is comparatively the lowest at the TVET level.
- Students’ device access at home is below par: less than half of students at the primary and secondary school and TVET levels have access to a computer or laptop at home. Access is higher at 67% among students in higher education. TV access at home is low, with 33% of students at the primary and secondary school, 26% at higher education, and 29% at TVET levels having access. On the other hand, smartphone access is high across all education levels.
- Similar to Indonesia, a key gap in students’ engagement with digital learning in Viet Nam is the relatively low quality of accessibility of learning content, with about half of students in the primary and secondary schools and TVET encountering challenges in downloading content or running into technical issues accessing it (e.g., incompatible file format).
Students use microscopes to examine cells in a lab. Availability of modern lab equipment and classroom devices creates learning advantages for students (photo by ADB).
CHAPTER 5

Digital Education Service Providers

Introduction

While federal and state governments play a critical role in enabling teachers and students to leverage the strengths of digital education via the provision of supporting infrastructure and policies, they may not be able to achieve digital readiness alone, owing to the potential need for subject matter expertise, technical know-how, and added resources, which can be facilitated through the private sector and multilateral partnerships. For example, governments in some countries have rolled out educational technology (EdTech) solutions for the primary and secondary schools and higher education, which were developed end-to-end by private EdTech companies—examples of solutions include testing platforms, digital hubs hosting content curated from various sources, teacher platforms, and, in some cases, multipurpose platforms.

The European Framework for Digitally-Competent Educational Organisations asserts the role of partnerships of educational institutions with other learning organizations, private and public sector organizations (including those in the technology and digital media sectors), and the wider community for exchanging knowledge and leveraging expertise as required.

Key Findings from the Digital Education Readiness Framework

The DERF includes the following subcategories under the Providers category for measuring the digital readiness of education: (i) e-learning systems, (ii) online content, (iii) integrators and emerging technology, and (iv) partners and sponsors. Table 5 summarizes the indicators and findings under each of the above subcategories.

Country Analysis

Across all five pillars, countries perform relatively the lowest in the Providers pillar, with six of the 10 DMCs in the “initial” category of readiness—Cambodia, Bangladesh, the Kyrgyz Republic, Mongolia, Pakistan, and Fiji (ordered from highest to lowest score). The other four countries are in the “emerging” category of readiness (Indonesia, the Philippines, Viet Nam, and Uzbekistan). The difference between the model country’s normalized score and the highest-scoring country’s score is almost 45 points (Figure 9).

In terms of maturity, falling in the “initial” category implies that the proportion of the tertiary workforce educated in ICT is low. Teachers do not use content or platforms created by private EdTech providers. The government is not partnering with stakeholders, including the private sector, to promote EdTech.

Those in the “emerging” category indicates that the proportion of the tertiary workforce educated in ICT is medium. Some teachers use content or platforms created by private EdTech providers (Figure 10). The government is partnering with at least one other stakeholder in the private sector and/or multilateral space to promote EdTech.
**Figure 9: Digital Education Readiness Framework—Service Providers Country Scores**

<table>
<thead>
<tr>
<th>Model Country</th>
<th>Indonesia</th>
<th>Philippines</th>
<th>Uzbekistan</th>
<th>Viet Nam</th>
<th>Cambodia</th>
<th>Bangladesh</th>
<th>Kyrgyz Republic</th>
<th>Mongolia</th>
<th>Pakistan</th>
<th>Fiji</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scores</td>
<td>100</td>
<td>55.3</td>
<td>50.4</td>
<td>35.4</td>
<td>35.4</td>
<td>34.0</td>
<td>30.6</td>
<td>23.6</td>
<td>22.2</td>
<td>16.7</td>
</tr>
</tbody>
</table>


**Figure 10: Teachers Using Private Educational Technology Platforms to Conduct Classes (%)**

- Bangladesh
- Cambodia
- Fiji
- Indonesia
- Kyrgyz Republic
- Mongolia
- Pakistan
- Philippines
- Uzbekistan
- Viet Nam
- Model Country

TVET = technical and vocational education and training.

Table 5: Key Findings in Digital Education Service Providers Category

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definition/Reasoning</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1: e-Learning Systems</strong></td>
<td></td>
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<tr>
<td>5.1.1 Proportion of teachers using private educational technology (EdTech) platforms to conduct classes</td>
<td>This subcategory measures the proliferation of digital learning platforms developed by private EdTech players in the current teaching and learning process.</td>
<td>• Use of EdTech platforms developed by private companies (e.g., Google Classroom, Edmodo, and Edubuntu) is still at a nascent stage across most developing member countries (DMCs), with Indonesia being a notable exception. The share of teachers using these platforms for conducting classes is low across the other DMCs, with the highest relative share found among technical and vocational education and training (TVET) teachers in Mongolia (32%), and the lowest share among TVET teachers in Uzbekistan (17%). There is, instead, a strong dependence on either video calling platforms or TV for hosting classes.</td>
</tr>
<tr>
<td>5.1.2 Proportion of teachers using private EdTech platforms to communicate and/or share with students</td>
<td></td>
<td>• In a similar finding, there is low use of private EdTech platforms by teachers for communicating and/or sharing with students, with the primary and secondary school teachers’ use being negligible. This trend is found across all DMCs, except Indonesia.</td>
</tr>
<tr>
<td><strong>2: Online Content</strong></td>
<td></td>
<td></td>
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<tr>
<td>5.2.1 Proportion of teachers using content designed by private EdTech providers</td>
<td>This subcategory measures the proliferation of digital content developed by private EdTech players in the current teaching and learning process.</td>
<td>• The share of teachers using digital content designed or curated by private providers is very low across all DMCs and at all educational levels, with Indonesia being an exception. Most teachers rely on self-created content using online resources.</td>
</tr>
<tr>
<td><strong>3: Integrators and Emerging Technology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3.1 Information and communication technology (ICT) graduates as a share of total tertiary education graduates</td>
<td>This subcategory measures the digital learning preparedness of the country from a labor force perspective. A workforce educated in ICT fields provides a strong foundation for the technical skills needed for successfully developing digital learning initiatives. It also enhances the probability of building a growing pool of EdTech entrepreneurs.</td>
<td>• The share of graduates in ICT fields out of the total pool of tertiary education graduates varies across the 10 DMCs, but is generally low across countries. Fiji has the lowest share (0.4%), and the Philippines has the highest (12%). The Philippines’ share is also close to the model country’s share of 13.6%.</td>
</tr>
<tr>
<td><strong>4: Partners/Sponsors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4.1 Has the government partnered with agencies to promote EdTech?</td>
<td>This subcategory aims at understanding the synergies between the government and other stakeholders, particularly private providers, in the digital learning ecosystem. It looks for evidence of memorandums of understanding or other agreements toward shared goal(s) (e.g., EdTech platform, curriculum design, teacher training, device access, etc.).</td>
<td>• Progress in forging partnerships between the government and other external stakeholders in the digital education ecosystem to advance digital education has been initiated across all 10 DMCs, with evidence of at least one partnership across all of them. The commitment to promote digital readiness is particularly evident in five out of the 10 countries (Bangladesh, Indonesia, the Philippines, Uzbekistan, and Viet Nam), where more than one instance of collaboration is found. (The country analysis section delves deeper into these partnerships).</td>
</tr>
</tbody>
</table>

Country-Specific Insights in the Service Providers Category

**Bangladesh** 30.6

- As Bangladesh’s overall pillar score indicates, there is significant room for improvement across various parameters in the Providers category. In terms of the use of private EdTech platforms in the teaching and learning process, only 21% of teachers at the primary and secondary school and higher education levels and 19% of teachers at the TVET level use such platforms for conducting classes.
- Most teachers also do not use digital content designed by private EdTech platforms.
- A key progress area in the digital education readiness of Bangladesh is the existence of partnerships between the national government and the multilateral and private sector stakeholders to advance remote learning via digital means. For example, in 2020, Bangladesh operationalized an education hub, *Education at Home*, which is planned and implemented by the Ministry of Education, Ministry of Primary and Mass Education, and the Department of Information and Communication Technology, in affiliation with UNESCO, UNICEF, Plan International, Google, Room to Read, and other local nongovernment organizations. ⁴¹

**Cambodia** 34.0

- Less than 30% of teachers at the primary and secondary school, higher education, and TVET levels conduct classes using private EdTech platforms. There is also very low use of privately designed digital content.
- With 9.7% of total tertiary education graduates completing ICT fields, Cambodia has a relatively high share of ICT-educated workforce when compared with the model country (13.6%).
- Since the COVID-19 pandemic started in March 2020, the Ministry of Education, Youth and Sport (MOEYS) has been working with UNESCO’s Capacity Development for Education Programme to improve distance learning through a series of interventions, including 200 video lessons made available on the MOEYS official online and digital learning platforms and the Techo TV channel. ⁴² Other interventions include the Strengthening Teacher Education Programmes in Cambodia, as part of which UNESCO helped the MOEYS develop online video lessons for grades 1–3 focused on Khmer literacy and mathematics. UNESCO also supported the development of the Basic Education Equivalency Program platform by the MOEYS for online video lessons for grades 7–9. ⁴³

**Fiji** 16.2

- In terms of the use of private EdTech platforms in teaching, less than 30% of teachers at the primary and secondary school, higher education, and TVET levels use such platforms for conducting classes. Very few teachers also use digital content designed by private players.
- Fiji produces very few ICT graduates from the pool of students graduating in tertiary education (0.4% of graduates). This is a crucial gap from the perspective of shaping a competent ICT-skilled workforce capable of lending expertise to delivering digital education solutions.
- Fiji is a member of the Commonwealth of Learning, which works in the areas of technical and vocational skills development and technology-enabled learning. One of its main projects in Fiji is the Virtual University for Small States of the Commonwealth, which "promotes technology-enabled learning through the provision..."

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of a learning platform and enables the transfer of credits across small states through the use of the Transnational Qualifications Framework.”

**Indonesia**

- Among the 10 DMCs, the use of private platforms for conducting classes and communicating with students is highest in Indonesia, with survey results showing that 75% of teachers in primary and secondary schools, 81% in higher education, and 60% in TVET use them. This may be attributed to the proliferation of global players (such as Udemy, Kahoot, Brainly, and Quipper) in the Indonesian EdTech sector in the past few years, who are primarily focusing on K-12, massive open online courses, homework solutions, and the LMS space. A notable example of a domestic start-up is Ruangguru, a tech-enabled education provider, whose first product was a tutoring marketplace. Since then, it has launched a range of products aimed at accelerating educational outcomes and has forged partnerships with 32 of Indonesia’s 34 provincial governments and more than 325 city and regency governments.

- There is some evidence of public, private, and multilateral cooperation to promote digital education in Indonesia. For example, the Indonesian education and culture ministry, in partnership with the World Bank and with funding from the Australian government, started the Improving Dimensions of Teaching, Education Management and Learning Environment (ID-TEMAN) Program in 2016 to improve remote and distance learning opportunities.

**Kyrgyz Republic**

- Less than a quarter of teachers at all educational levels in the Kyrgyz Republic reported using EdTech platforms provided by private players both for conducting classes and for communicating or sharing with students. In fact, none of the teachers in the primary and secondary schools reported using these platforms.

- The use of digital content provided by private EdTech players is even lower.

- The national budget of the Kyrgyz Republic for 2021 allocates funds toward projects with ADB and the World Bank in the education sector. ADB’s program for the Kyrgyz Republic, Strengthening Education System Sector Development Program, aims to assist the country in developing electronic education standards as well as technology-assisted e-education modules in an effort to provide a high-quality distance education teaching modality option to aspiring teachers. The budget also lists a grant from the World Bank under its project, Education Project for the Future. Among other goals, this project aims to finance and “support IT equipment for teaching and learning purposes” and to “provide digital literacy training for 36,000 teachers to enhance their capacities to use digital technologies for professional development and effective teaching.”

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Mongolia

- Mongolia lags behind in the proliferation of private EdTech platforms, as the survey findings show. Similarly, the use of digital content designed by private EdTech companies is low.
- The Ministry of Education and Science of Mongolia collaborated with the United Nations (UN) agencies—the United Nations Resident Coordinator Office (UN RC-Mongolia), UNESCO, UNICEF, and United Nations Population Fund (UNFPA)—for their technical assistance, with funding support from the UN COVID-19 Response and Recovery Multi-Partner Trust Fund to streamline e-learning. A stakeholder consultation on its Draft ICT Education Policy with the government and UN partners addressed “mainstreaming of ICT at all levels of the education system, capacity gaps, infrastructure, (a) national online learning platform, resource constraints, policy and regulatory gaps, monitoring, financing and governance issues.”

Pakistan

- Less than 30% of teachers at the primary and secondary school, higher education, and TVET levels in Pakistan conduct classes using private EdTech platforms. Similarly, the use of these platforms for communicating and/or sharing with students is very low, with none of the teachers in the primary and secondary schools reportedly using them.
- Among all 10 DMCs, Pakistan has one of the lowest shares of ICT graduates from the total pool of tertiary education graduates (1.1%).

• Pakistan is a partner state to the Global Partnership for Education (GPE). According to the GPE report on progress on grant usage by Sindh and Balochistan regions from October 2020, “through a $66 million GPE grant, the Sindh Province used tech tools to ensure teachers were deployed to the areas where they were most needed” while “in Balochistan, apps keep track of teacher attendance, recording when teachers are within a certain geo-radius of the school; they work offline in more remote areas, uploading information when there is network access”. It also notes that the grant money is leading to an “ambitious distance learning scheme being rolled out across Pakistan.”

Philippines  

• Less than a quarter of teachers at all educational levels in the Philippines reported using EdTech platforms provided by private players both for conducting classes and for communicating or sharing with students. In fact, none of the primary and secondary school teachers reported using these platforms for communication.
• A key strength of the digital education readiness of the Philippines is the existence of partnerships between the national government and the multilateral and private sector stakeholders to advance remote learning via digital means. The DepEd partnered with Globe Telecommunications from 2015 to 2018 to establish 218 Global Filipino Schools that provided “Internet connectivity, tablets, virtual reality goggles, modems, mobile phones, and teacher training on ICT integration and digital citizenship.” Although Globe Telecommunications turned over operations to DepEd in 2019, they reportedly still actively support DepEd and engage with the schools directly.

Uzbekistan  

• Less than a quarter of surveyed teachers at all three educational levels reported using private EdTech platforms for conducting classes in Uzbekistan.
• Similarly, the use of digital content designed by private EdTech companies is low: only 5% of teachers at the primary and secondary school, 4% at higher education, and 12% at TVET levels reported using such content.
• Similar to Bangladesh and the Philippines, there is significant progress in Uzbekistan in building partnerships between the national government and the multilateral and private stakeholders to advance digital learning. For example, the government partnered with ADB as part of its National Program for Basic Education Development (2008–2011) for a project to integrate ICT in teaching and learning. This project provides in-service training in the use of information technology for education for teachers in schools (footnote 31). The Kundalik educational information system used by the government has been developed in partnership with a private educational technology company, Kundalik, which has developed the platform and builds e-learning environments for various stakeholders.

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Viet Nam

• The use of private EdTech platforms by teachers for conducting classes and communicating with students in Viet Nam varies by educational level, but is generally low: 31% of teachers in primary and secondary schools, 39% in higher education, and 23% in TVET use these platforms for conducting classes. The proportion of teachers using content designed by private service providers is even lower—less than a quarter of teachers, on average.

• There is some evidence that the Government of Viet Nam has partnered with agencies to promote digital education in the country. The project, Building Viet Nam’s Quality Assurance Capabilities of Blended and Online Higher Education Courses and Qualifications, is funded by Australia’s Department of Education, Skills and Employment.57 Further, Viet Nam’s Minister of Education and Training held an online meeting in 2020 with the Representative of UNICEF in Viet Nam on UNICEF’s assistance and areas of collaboration with Viet Nam’s education sector in promoting digital education, among others.58

• A key and innovative initiative in the area of student performance management is a 2020 agreement between Viet Nam’s education ministry and the Singapore-based blockchain platform, TomoChain, as part of which blockchain technology is used to archive student records. The National Qualifications Archive program uploads all certifications achieved by Viet Nam’s high school and higher education students to the TomoChain public blockchain to create a transparent and immutable record.59

Conclusion

The findings of the Digital Education Readiness Framework (DERF) show that progress has commenced toward achieving digitally empowered education systems at all educational levels across the DMCs. This progress was given a robust push during the COVID-19 pandemic, when the extent of learning losses in developing countries became apparent fairly quickly with its onset. However, it is key for countries to guard against temporary crisis-induced responses and instead tailor their digital education strategies toward the long term, keeping in focus the enduring returns that would be generated as a result.

The message from the DERF’s results is clear: transitioning from inflexible, only in-person systems of learning to adaptive, multimodal systems would require coordinated efforts between various key stakeholders, including governments, teachers, students, and the private and multilateral entities. Stressing on the role of just one or two of these presents a lopsided approach. The mere provision of devices and connectivity to teachers and students would be ineffective unless combined with formal digital education delivery training modules for teachers. Stronger participation of private players would only yield returns if the government integrates digital education expansion in its policy and legislative mandate.

While the DERF calls for a systemic approach to digital education readiness, the research and survey data have helped identify a few relatively urgent priorities. These include the following:

(i) providing inclusive device access to students, with a focus on education-friendly devices, such as computers, laptops, and tablets, as opposed to mobile phones (given research suggesting better engagement with students via the computers, laptops, and/or tablets);60

(ii) achieving countrywide Internet access;

(iii) making funding and legislative commitments that would allow governments to go beyond pilot initiatives and roll out countrywide solutions around teacher training, ICT infrastructure access, and school digitization; and

(iv) creating incentive-driven environments for private companies to design EdTech solutions that cover the full scope of teaching and learning, and that would, importantly, help students and teachers to take advantage of medium- and high-tech learning environments, as opposed to largely social media-based platforms.

The results also show that the primary and secondary schools, in particular, need special focus and guidance toward integrating digital education in their governance.

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APPENDIX 1

Process of Data Collection and Modeling for the Digital Education Readiness Framework

Data for the Digital Education Readiness Framework (DERF) was collected across 56 quantitative and qualitative indicators, which can be classified in three ways based on source of data collection:

(i) **Secondary research-based qualitative indicators.** These typically include indicators that cannot be quantitatively assessed, and instead are framed as Yes/No questions or questions involving multiple choices. These are assigned a score in accordance with the designed scoring scheme (e.g., indicator 2.1.1 above). The score is normalized from 0 to 100 as a final step.

(ii) **Survey-based indicators.** These indicators derive evidence from the survey results, with some being scored qualitatively and others using actual data values (e.g., indicator 3.1.1 above). Both scores and data values are normalized from 0 to 100 as a final step.

(iii) **Quantitative data-based indicators.** These indicators are measured as point estimates through centralized, quantitative datasets (e.g., indicator 1.1.1 above). The data values are normalized from 0 to 100 as a final step.

The following procedures were followed for data collection and analysis of indicators:

- **Primary research through survey of teachers to assess digital readiness.** A survey questionnaire was designed to collect data for the indicators under categories 3 and 4—i.e., school/teachers and parents/students (data source classification (ii) above), as well as a few under categories 1 and 5. An average of 1,000 teachers were surveyed in each of the 10 countries. For the four Asian Development Bank (ADB) project countries (Bangladesh, Cambodia, the Kyrgyz Republic, and Uzbekistan), a part of schoolteacher data was taken from ADB’s existing survey data. Other considerations include as follows:

  - Sample size across countries was split with due consideration to the population. Sample size was higher (1,200) for countries with larger teacher population (e.g., Pakistan and the Philippines) and lower (800) for countries with smaller teacher population (e.g., Fiji and Mongolia).

  - The sample was split across the three categories, keeping in mind the proportion of primary and secondary school teachers, higher education teachers, and technical and vocational education and training (TVET) instructors.

- **Secondary research.** Desk research was conducted to gather data for the indicators for which data is available in the public domain (i.e., for indicators in data source classifications (i) and (iii) above). Key sources for qualitative indicators will include texts of laws, regulations, and other legal documents; websites of government authorities and international organizations; academic studies; and/or local and international news or media reports. The research for qualitative metrics feeds into a score, a justification (i.e., a 300–400-word write-up presenting evidence that justifies the score or documents the lack of evidence, as the case may be), and a list of references used for the research. Sources for quantitative indicators include the International Telecommunication Union, GSM Association, the World Bank, and Ookla, among others.

- **Data consolidation and normalization.** The evidence from primary and secondary data was fed into the relevant DERF indicators, and data transformation was performed as necessary—e.g., conversion of survey results into scores based on the scoring scheme designed for each question. Once the data across all indicators were collected, the indicator data values were normalized from 0 to 100 to render indicators with different units of measurement comparable.
• **Data analysis and quality assurance.** This stage involves interpreting countries’ overall scores, as well as category- and indicator-level scores, to understand their relative strengths and weaknesses and build a macroscopic view of the digital readiness maturity of each country as well as all countries in aggregate. In the data analysis process, sensitivity analysis of the data is also performed to ensure the numbers are making sense. This includes checks like correlations between indicator outputs, visual analysis, and calibration. The quality assurance process involves an examination of indicator scores across countries, rather than by individual countries. This helps detect outliers for further investigation and validation.

### Calculation of Digital Education Readiness Framework Scores

Modelling the indicators, subcategories, and categories in the DERF results in overall scores of 0–100 for each country, in which 100 represents the most favorable digital education readiness conditions possible and 0 the least favorable. A score of 100 in the framework does not indicate that a country has perfect digital education readiness conditions, and a score of 0 does not mean that a country has no digital education capacity. Instead, scores of 100 and 0 represent the highest or lowest possible scores, respectively, as measured by the DERF’s criteria. The minimum and maximum thresholds for each indicator were calculated from the minimum and maximum data values recorded across all countries in the publicly available data. The indicators are grouped into subcategories, which in turn are grouped into categories. Their values are summed to determine the value of the subcategory:

\[
\text{subcategory score} = \sum \text{weighted individual indicators}
\]

For the framework, the subcategories are classified into five categories. The category values are a weighted total of the subcategories in the category:

\[
\text{category score} = \sum \text{weighted individual subcategories}
\]

The category values have been normalized on the basis of the following equation:

\[
x = \frac{(x - \text{Min}(x))}{(\text{Max}(x) - \text{Min}(x))}
\]

where \(\text{Min}(x)\) and \(\text{Max}(x)\) are the lowest and highest values, respectively, of the model country for any given indicator. The normalized value (i.e., a score of 0–100) makes it directly comparable with other normalized indicator scores.

Table A1.1 shows the calculation of a sample subcategory score under the Infrastructure category.

<table>
<thead>
<tr>
<th>Number</th>
<th>Power/Electricity</th>
<th>Normalized Score (0–100)</th>
<th>Weight</th>
<th>Weighted Score</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>Subcategory score</td>
<td></td>
<td></td>
<td></td>
<td>80.10</td>
</tr>
<tr>
<td>1.3.1</td>
<td>Urban electricity access</td>
<td>83.3</td>
<td>50.0%</td>
<td>50.0% of 83.3</td>
<td>41.65</td>
</tr>
<tr>
<td>1.3.2</td>
<td>Rural electricity access</td>
<td>76.9</td>
<td>50.0%</td>
<td>50.0% of 76.9</td>
<td>38.45</td>
</tr>
</tbody>
</table>

Table A1.2 shows the calculation of a sample category score.

### Table A1.2: Sample Category Score for a Country

<table>
<thead>
<tr>
<th>Number</th>
<th>Category</th>
<th>Normalized Score (0–100)</th>
<th>Weight</th>
<th>Weighted Score (%) of (0–100)</th>
<th>Overall Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Internet connectivity, usage, and cost</td>
<td>68.9</td>
<td>25.0%</td>
<td>25.0% of 68.9</td>
<td>17.23</td>
</tr>
<tr>
<td>1.2</td>
<td>ICT devices/hardware</td>
<td>97.3</td>
<td>25.0%</td>
<td>25.0% of 97.3</td>
<td>24.33</td>
</tr>
<tr>
<td>1.3</td>
<td>Power/electricity</td>
<td>80.1</td>
<td>25.0%</td>
<td>25.0% of 80.1</td>
<td>20.03</td>
</tr>
<tr>
<td>1.4</td>
<td>Television broadcasting</td>
<td>63.5</td>
<td>25.0%</td>
<td>25.0% of 63.5</td>
<td>15.88</td>
</tr>
</tbody>
</table>

ICT = information and communication technology.


The overall score for each country is the weighted sum of the category scores, as determined by the weighting profile:

$$\text{Overall score} = \sum \text{weighted category scores}$$

Table A1.3 shows the calculation of a sample overall score for a country.

### Table A1.3: Sample Overall Score for a Country

<table>
<thead>
<tr>
<th>Number</th>
<th>Overall Score</th>
<th>Normalized Score (0–100)</th>
<th>Weight</th>
<th>Weighted Score (%) of (0–100)</th>
<th>Overall Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infrastructure</td>
<td>77.47</td>
<td>20.0%</td>
<td>20.0% of 77.47</td>
<td>15.50</td>
</tr>
<tr>
<td>2</td>
<td>Government and Policy</td>
<td>67.3</td>
<td>20.0%</td>
<td>20.0% of 67.3</td>
<td>13.46</td>
</tr>
<tr>
<td>3</td>
<td>Schools and Teachers</td>
<td>89.1</td>
<td>20.0%</td>
<td>20.0% of 89.1</td>
<td>17.82</td>
</tr>
<tr>
<td>4</td>
<td>Students and Parents</td>
<td>86.2</td>
<td>20.0%</td>
<td>20.0% of 86.2</td>
<td>17.24</td>
</tr>
<tr>
<td>5</td>
<td>Providers</td>
<td>73.2</td>
<td>20.0%</td>
<td>20.0% of 73.2</td>
<td>14.64</td>
</tr>
</tbody>
</table>


### Overcoming Data Gaps

For some indicators, data was missing for a few countries. The data gaps were primarily addressed via the following approach:

(i) **Using regional, demographic, and income averages.** This involved identifying countries with a similar regional, demographic, and income profile; calculating the average value of the indicator for this group of countries; and employing this average for the country with missing data.

(ii) **Vetting the calculated proxy.** To ensure the robustness of the proxy value for the country calculated in the previous step, the data point was triangulated through qualitative research, interviews, and consultation with the Economist Intelligence Unit country experts.
There may be some deviations at the individual criterion level between the pillar definitions for each score category and the observed results. But the observed results are expected to lead to the same key outcomes for digital education ecosystems.

Table A2: Key Outcomes Across Different Stages of Digital Learning Ecosystem

<table>
<thead>
<tr>
<th>Score</th>
<th>Pillar Initial</th>
<th>Emerging</th>
<th>Developed</th>
<th>Mature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
<td>Access to and affordability of required ICT infrastructure, including Internet connectivity, ICT devices, and electricity is low (normalized score ≤35 against the best-case scenario).</td>
<td>Access to and affordability of required ICT infrastructure, including Internet connectivity, ICT devices, and electricity is medium (normalized score &gt;35 and ≤75 against the best-case scenario).</td>
<td>Access to and affordability of required ICT infrastructure, including Internet connectivity, ICT devices, and electricity is high (normalized score &gt;75 and ≤90 against the best-case scenario).</td>
<td>Access to and affordability of required ICT infrastructure, including Internet connectivity, ICT devices, and electricity is ideal for digital learning (normalized score &gt;90 against the best-case scenario).</td>
</tr>
<tr>
<td><strong>Government/Policy</strong></td>
<td>The government has not integrated digital learning in its education policies, programs, curriculum and/or content delivery and performance management, and teacher training (normalized score ≤35 against the best-case scenario).</td>
<td>The government has initiated the integration of digital learning in its education policies, programs, curriculum and/or content delivery and performance management, and teacher training (normalized score &gt;35 and ≤75 against the best-case scenario).</td>
<td>The government has integrated digital learning in its education policies, programs, curriculum and/or content delivery and performance management, and teacher training (normalized score &gt;75 and ≤90 against the best-case scenario).</td>
<td>The government has integrated digital learning in its education policies, programs, curriculum and/or content delivery and performance management, and teacher training, and mandated its adoption at the institutional level (normalized score &gt;90 against the best-case scenario).</td>
</tr>
<tr>
<td><strong>Schools/Teachers</strong></td>
<td>Teachers do not have the required skills to use digital tools and platforms for teaching/creating content and/or engaging students in learning activities. Very few teachers have access to ICT equipment/software, high-speed Internet, and online communities of practice. No data collection mechanism in place (normalized score ≤35 against the best-case scenario).</td>
<td>Teachers have some of the required skills to use digital tools and platforms for teaching/creating content and/or engaging students in learning activities. Some teachers have access to ICT equipment/software, high-speed Internet, and online communities of practice. Data collection mechanism ranges from being paper-based to computerized (but requiring manual input) (normalized score &gt;35 and ≤75 against the best-case scenario).</td>
<td>Teachers have most of the required skills to use digital tools and platforms for teaching/creating content and/or engaging students in learning activities. Most teachers have access to ICT equipment/software, high-speed Internet, and online communities of practice. Data collection mechanism is semi-automated, and most schools have the required technical support (normalized score &gt;75 and ≤90 against the best-case scenario).</td>
<td>Teachers have all the required skills to use digital tools and platforms for teaching, creating content, and engaging students in learning activities. Nearly all teachers have access to ICT equipment and/or software and high-speed Internet, and online communities of practice. Data collection is automated; nearly all schools have required technical support (normalized score &gt;90 against the best-case scenario).</td>
</tr>
</tbody>
</table>
### Students/ Parents

<table>
<thead>
<tr>
<th>Score</th>
<th>Initial</th>
<th>Emerging</th>
<th>Developed</th>
<th>Mature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students do not have</td>
<td>Students do not have the capability to use digital tools.</td>
<td>Students have the capability to use basic digital tools. Some students have access to ICT</td>
<td>Students have the capability to use moderately advanced digital tools. Most students have</td>
<td>Nearly all students have the capability to use advanced digital tools and access to the</td>
</tr>
<tr>
<td>the capability to use</td>
<td>digital tools. Some students have access to ICT devices, digital curriculum content, and</td>
<td>devices, digital curriculum content, and communication channels with teachers (normalized</td>
<td>access to ICT devices, digital curriculum content, and communication channels with teachers</td>
<td>Internet, ICT devices, digital curriculum content, and communication channels with</td>
</tr>
<tr>
<td>digital tools.</td>
<td>communication channels with teachers (normalized score ≤ 35 against the best-case scenario).</td>
<td>score &gt; 35 and ≤ 75 against the best-case scenario).</td>
<td>(normalized score &gt; 75 and ≤ 90 against the best-case scenario).</td>
<td>teachers (normalized score &gt; 90 against the best-case scenario).</td>
</tr>
<tr>
<td>Most students do not</td>
<td>Most students do not have access to ICT devices, digital curriculum content, and communication</td>
<td>Normalized score &gt; 75 and ≤ 90 against the best-case scenario.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>have access to ICT</td>
<td>channels with teachers (normalized score ≤ 35 against the best-case scenario).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>devices, digital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>curriculum content,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>channels with teachers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(normalized score ≤ 35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>against the best-case</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scenario).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Providers

<table>
<thead>
<tr>
<th>Score</th>
<th>Initial</th>
<th>Emerging</th>
<th>Developed</th>
<th>Mature</th>
</tr>
</thead>
<tbody>
<tr>
<td>The proportion of the</td>
<td>The proportion of the tertiary workforce educated in ICT is low. Teachers do not use content or</td>
<td>The proportion of the tertiary workforce educated in ICT is medium. Some teachers use</td>
<td>The proportion of the tertiary workforce educated in ICT is high. Most teachers use</td>
<td>The proportion of the tertiary workforce educated in ICT is ideal for digital learning.</td>
</tr>
<tr>
<td>tertiary workforce</td>
<td>platforms created by private EdTech providers. The government is not partnering with stakeholders,</td>
<td>platforms created by private EdTech providers. The government is partnering with one other</td>
<td>platforms created by private EdTech providers. The government is partnering with more than</td>
<td>Nearly all teachers use content or platforms created by private EdTech providers. The</td>
</tr>
<tr>
<td>educated in ICT is</td>
<td>the private sector, to promote EdTech (normalized score ≤ 35 against the best-case scenario).</td>
<td>other stakeholder in the private sector to promote EdTech (normalized score &gt; 35 and ≤ 75</td>
<td>other stakeholder, including the private sector, to promote EdTech (normalized score &gt; 75</td>
<td>government is partnering with multiple stakeholders to promote EdTech (normalized score &gt;</td>
</tr>
<tr>
<td>use content or platforms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>created by private</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EdTech providers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The government is not</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>partnering with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stakeholders, including</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the private sector, to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>promote EdTech</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(normalized score ≤ 35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>against the best-case</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>scenario).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Overall Outcomes

<table>
<thead>
<tr>
<th>Score</th>
<th>Primarily in-person learning: i.e., traditional mode of teaching and learning solely reliant on physical classroom education</th>
<th>Blended learning: i.e., remote learning, distance learning, online learning. Partial inclusion of flipped learning and project-based learning using technology</th>
<th>Digital learning: i.e., elements of blended learning + digital Teacher Professional Development and digital classrooms</th>
<th>Adaptive learning: i.e., elements of digital learning + smart Ministry of Education, smart school, smart classroom</th>
</tr>
</thead>
</table>

EdTech = educational technology, ICT = information and communication technology.

The following section provides definitions and guidelines to the scoring matrix used and the descriptions of the individual indicators based on a specific numbering system used for the index. For example, for each indicator presented, detailed description of what it measures and how it is scored is provided.

### Table A3: Digital Education Readiness Framework Definitions, Scoring Guidelines, and Data Sources

<table>
<thead>
<tr>
<th>No.</th>
<th>Category, Subcategory, and Indicator</th>
<th>Data Source</th>
<th>Description</th>
<th>Scoring Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infrastructure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Internet Connectivity, Usage, and Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.1</td>
<td>Internet users</td>
<td>ITU</td>
<td>This indicator measures the percentage of households with Internet. This can include both estimates and survey data corresponding to the proportion of households with Internet. The proportion of households with Internet access at home is calculated by dividing the number of in-scope households with Internet access by the total number of in-scope households. Internet users are individuals who have used the Internet (from any location) in the last 12 months. Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV, etc.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.1.2</td>
<td>Average fixed broadband Internet upload speed</td>
<td>Ookla Speedtest</td>
<td>This measures average fixed broadband upload speed. The average is taken based on Ookla’s analysis of Speedtest data collected between 1 July 2020 and 30 June 2021 of the calendar year. A faster speed is a positive indicator of better performance.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.1.3</td>
<td>Average fixed broadband Internet download speed</td>
<td>Ookla Speedtest</td>
<td>This measures average fixed broadband download speed. The average is taken based on Ookla’s analysis of Speedtest data collected between 1 July 2020 and 30 June 2021 of the calendar year. A faster speed is a positive indicator of better performance.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
</tbody>
</table>
### Table A3 continued

<table>
<thead>
<tr>
<th>No.</th>
<th>Category, Subcategory, and Indicator</th>
<th>Data Source</th>
<th>Description</th>
<th>Scoring Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>Average mobile Internet upload speed</td>
<td>Ookla Speedtest</td>
<td>This measures average mobile broadband upload speed. The average is taken based on Ookla's analysis of Speedtest data collected between 1 July 2020 and 30 June 2021 of the calendar year. A faster speed is a positive indicator of better performance.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.5</td>
<td>Average mobile Internet download speed</td>
<td>Ookla Speedtest</td>
<td>This measures average mobile broadband download speed. The average is taken based on Ookla's analysis of Speedtest data collected between 1 July 2020 and 30 June 2021 of the calendar year. A faster speed is a positive indicator of better performance.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.6</td>
<td>Is Internet connectivity in students' homes stable and fast enough for online classes?</td>
<td>Economist Impact Teachers' Survey 2021</td>
<td>The survey question corresponding to this is: If you are conducting classes online, do students have a stable and fast Internet connection to enable them to attend classes without interruption? (a) Internet quality is an issue for most students, causing disruption to their learning experience. (b) Internet quality is an issue for some students, causing disruption to their learning experience. (c) Internet quality is not an issue for most students.</td>
<td>1 = No, 2 = No, but only for some students, 3 = Yes</td>
</tr>
<tr>
<td>1.7</td>
<td>Mobile broadband cost (% of monthly GNI per capita)</td>
<td>ITU</td>
<td>The data-only mobile broadband basket refers to the price of a monthly subscription to an entry-level mobile broadband plan. It is calculated as a percentage of a country’s average monthly GNI per capita. The data-only mobile broadband basket is based on a monthly data usage of (a minimum of) 1.5 GB (irrespective of the device used). For plans that limit the monthly amount of data transferred by including data volume caps below 1.5 GB, the cost for the additional bytes is added to the basket. The minimum speed of a broadband connection is 256 Kbps. The data-only mobile broadband basket is based on the most common contract modality (prepaid and/or postpaid) in the country. If more than 50% of mobile cellular subscriptions are postpaid, then a postpaid plan is chosen. Otherwise, a prepaid plan is selected.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
</tbody>
</table>

continued on next page
<table>
<thead>
<tr>
<th>No.</th>
<th>Category, Subcategory, and Indicator</th>
<th>Data Source</th>
<th>Description</th>
<th>Scoring Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>GNI per capita data is from the World Bank’s World Development Indicators, 2019 (or last available year). GNI per capita current LCU is used for all cases, unless when prices are registered in United States dollar ($). In those cases, the Atlas method (current $) is used instead.</td>
<td></td>
</tr>
<tr>
<td>1.1.8</td>
<td>Fixed line broadband cost (% of monthly GNI per capita)</td>
<td>ITU</td>
<td>The fixed broadband basket refers to the price of a monthly subscription to an entry-level fixed broadband plan. It is calculated as a percentage of a country’s average monthly GNI per capita. The fixed broadband basket is based on a monthly data usage of (a minimum of) 5 GB. For plans that limit the monthly amount of data transferred by including data volume caps below 5 GB, the cost for the additional bytes is added to the basket. The minimum speed of a broadband connection is 256 Kbps.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.2</td>
<td>ICT Devices/Hardware</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.1</td>
<td>Cost of entry-level Internet-enabled handset, expressed as a percentage of monthly GNI per capita</td>
<td>GSMA</td>
<td>This indicator measures the indexed score of the price of an entry-level handset to the consumer, as a percentage of GNI per capita. This indicator is based on the Mobile Connectivity Index, developed by GSMA.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.2.2</td>
<td>Computer users</td>
<td>ITU</td>
<td>This indicator measures the percentage of households that have a computer.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.2.3</td>
<td>Smartphone users</td>
<td>ITU</td>
<td></td>
<td></td>
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<thead>
<tr>
<th>No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>Power/Electricity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.1</td>
<td>Urban electricity access</td>
<td>World Bank</td>
<td>This captures the urban electrification rate, i.e., the percentage of urban population with access to electricity. Electrification data are collected from industry, national surveys, and international sources.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.3.2</td>
<td>Rural electricity access</td>
<td>World Bank</td>
<td>This captures the rural electrification rate, i.e., the percentage of rural population with access to electricity. Electrification data are collected from industry, national surveys, and international sources.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.4</td>
<td>Television Broadcasting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4.1</td>
<td>Households with television</td>
<td>ITU</td>
<td>Television can serve as a mass disseminator of education in countries that are at the lower end of the maturity spectrum when it comes to digital education. This indicator measures the availability of TV infrastructure in a country.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>1.4.2</td>
<td>Cable TV subscriptions</td>
<td>ITU</td>
<td>This indicator covers cable TV subscriptions. Cable TV subscriptions refer to multichannel TV programming delivered over coaxial cable networks. It includes both analogue and digital cable TV subscriptions. If the breakdown of analogue/digital cable TV subscriptions is available, data for each type of cable TV subscriptions should be specified in a note. It excludes IPTV delivered over cable TV networks.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>2</td>
<td>Government/Policy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Policy/Funding</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.1.1</td>
<td>Is there a national plan or strategy for EdTech adoption in schools, as part of the education policy, that covers the following objectives?</td>
<td>Economist Impact research</td>
<td>This question examines whether the introduction and continuation of digital education is a part of the formal policy formulation of the national government. It also measures how comprehensive the policy/plan/strategy is in terms of the number and types of goals it covers.</td>
<td>0 = No. 1 = Yes, and it covers one of the below objectives. 2 = Yes, and it covers two of the below objectives. 3 = Yes, and it covers all three objectives.</td>
</tr>
<tr>
<td></td>
<td>(i) digitizing national curriculum,</td>
<td></td>
<td></td>
<td>Objectives:</td>
</tr>
<tr>
<td></td>
<td>(ii) increasing device access for</td>
<td></td>
<td></td>
<td>(i) digitizing</td>
</tr>
<tr>
<td></td>
<td>schools, and</td>
<td></td>
<td></td>
<td>national curriculum,</td>
</tr>
<tr>
<td></td>
<td>(iii) rolling out a national EdTech</td>
<td></td>
<td></td>
<td>(ii) increasing</td>
</tr>
<tr>
<td></td>
<td>LMS and/or IMS platform (either</td>
<td></td>
<td></td>
<td>device access for</td>
</tr>
<tr>
<td></td>
<td>developed by the government</td>
<td></td>
<td></td>
<td>schools, and</td>
</tr>
<tr>
<td></td>
<td>independently, or in partnership</td>
<td></td>
<td></td>
<td>(iii) rolling out</td>
</tr>
<tr>
<td></td>
<td>with a private player)</td>
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Table A3 continued

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<tr>
<td>(iii)</td>
<td>rolling out a national EdTech LMS and/or IMS platform (either developed by the government independently, or in partnership with a private player)</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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</table>

### 2.1.2 Is the government providing funding for the use of technology in education, or has the government committed funds through its national strategy/other policy documents to proliferate technology in education?

**Economist Impact research**

This indicator examines the government’s commitment to digital education via funding. For this question, evidence of funding for expanding digital education could include the government’s financing of initiatives around digital education—e.g., providing EdTech access to schools, training of teachers in EdTech, and expansion of Internet infrastructure (the latter would count only if the stated purpose of the expansion is to increase digital education readiness).

Alternatively, evidence of a documented commitment of funding within the last 3 years would count. This would likely be available via policy/strategy documents of the country’s education ministry or other relevant agency.

0 = No  
1 = Yes

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

### 2.1.3 Does the country have a data privacy/security law applicable to private EdTech companies?

**Economist Impact research**

As the EdTech space is increasingly becoming dotted with private players setting up digital platforms for learning that collect personal data of students, teachers, and parents who use these platforms, a strong legal framework that protects this data from any form of misuse is critical. This indicator measures a country’s ability to do so. If the country has a data protection law that covers all private companies, without specifying private EdTech providers, this would count as evidence.

0 = No, it does not have a privacy law, or it has a privacy law that does not cover private companies.  
1 = Yes, it has a privacy law, and it applies to private EdTech players or covers all private entities in its scope, leading to interpretation of inclusion of private EdTech players.

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

### 2.2 Curriculum/Content Delivery and Performance Management

#### 2.2.1 Availability of digital content: Does the government provide digital content for education?

**Economist Impact research**

As part of promoting digital learning readiness, this indicator measures the government’s own role in digitizing the curriculum. Evidence for this question may take either of a few different forms, for example:

- The government has a prescribed curriculum, and it has digitized this curriculum (or a part of it).

0 = No  
1 = Yes

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.
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|     |                                     |             | - The government has a digital learning platform, which also houses content created by itself.  
- The government has dedicated online resources for students and/or teachers (educational websites, online assessment websites, training websites, digital library, etc.). |  |
| 2.2.2 | Does the government’s learning/information management platform have the capability for education performance measurement? | Economist Impact research | This indicator assesses the extent to which the country’s official learning platform, if it exists, has matured to the point of being able to collect and analyze students’ performance data. | 0 = No, or the government does not have a learning or information management platform.  
1 = The government’s learning or information management platform is equipped to digitally collect and analyze educational performance data, but does not have a functionality to deliver assessment and testing online.  
2 = The government’s learning or information management platform is equipped to digitally collect and analyze educational performance data, and also has a functionality to deliver assessment and testing online.  
Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |

2.3 Training

2.3.1 What steps is the government taking to facilitate or train teachers in digital skills/education? | Economist Impact research | This metric assesses institutional progress in equipping teachers with the necessary know-how and skills to integrate technology in teaching functions, from conducting classes to performance assessment. | 0 = The government has not taken any steps.  
1 = The government has developed a digital skills/education curriculum for the training of teachers.  
2 = The government has developed programs/initiatives to train teachers in digital skills/education, but they are not included in their formal training as teachers.  
3 = Digital skills/education is included in the formal training of teachers.  
Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |
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</thead>
<tbody>
<tr>
<td>3.1.1</td>
<td>Teacher Capacity in EdTech</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Have you received digital/ICT skills training or any training on how to use technology to deliver education online? (a) No, I have not received any digital and/or ICT skills training. (b) Yes, I have received basic training that did not cover the skills required for EdTech. (c) Yes, I have received training that covered skills required for EdTech.</td>
<td>0 = No, or they have received digital skills training, but it did not cover skills required for EdTech. 1 = Yes, they have received digital skills training including skills required for EdTech. Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.1.2</td>
<td>Use of digital platforms in teaching: Do teachers use digital platforms to conduct classes?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What platform do you use to conduct classes? Please select all that apply. (a) I don’t use any platform. (b) Government online education platform. (c) Other online learning platforms (Google Classroom, Edmodo, Edubuntu, Khan Academy, etc.). (d) Social media (e.g., YouTube, Facebook, Telegram, WhatsApp). (e) Video calling platforms (e.g., Zoom, Google Meet).</td>
<td>0 = No 1 = Teachers predominantly use social media and/or video calling platforms. 2 = Teachers predominantly use digital learning platforms (government or private). Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.1.3</td>
<td>Use of digital platforms in teaching: Do teachers use digital platforms to communicate with students? (e.g., providing information, updates, class scheduling)</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What platform do you use to communicate and/or share digital content with students? Please select all that apply. If the answer is (c), please write the name of the platform. (a) I don’t use any digital platform. (b) Government online education platform. (c) Other online learning platforms (e.g., Google Classroom, Edmodo, Edubuntu, Khan Academy) (Please write the name of the platform). (d) Social media (e.g., YouTube, Facebook). (e) Social messaging application (e.g., Telegram, WhatsApp). (f) Online file sharing (e.g., Dropbox, Google Drive, Xender). (g) E-mail.</td>
<td>0 = No 1 = Teachers predominantly use social media, social messaging, and/or e-mail. 2 = Teachers predominantly use digital learning platforms (government or private) and or file-sharing media. Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>No.</td>
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<tr>
<td>3.1.4</td>
<td>Use of digital platforms in assessment: Do teachers use digital platforms for online assessment?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: I use technology to complete these tasks related to student assessment: Please select all that apply. (a) Create an assessment (b) Have students complete the assessment (c) Grade the assessment (d) Evaluate students’ mastery of course content based upon the assessment (e) None of the above</td>
<td>0 = No. 1 = Teachers use digital platforms but only for creating assignments. 2 = Teachers use digital platforms for creating assignments as well as having students complete those assignments. 3 = Teachers use digital platforms for creating assignments, having students complete those assignments, and grading them. 4 = Teachers use digital platforms for creating assignments, having students complete those assignments, grading them, and evaluating students’ mastery of course based on the assessment.</td>
</tr>
</tbody>
</table>

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

| 3.1.5 | Teacher-driven creation of learning content: Do teachers engage in creating learning content themselves? | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: Do you teach using digital content? Who provides/creates this content? (Includes digitized textbooks and other multimedia content) Please select all that apply. (a) I don’t use digital content. (b) Content is created by me. (c) Content is provided by the government. (d) Content is from private EdTech providers. (e) Content is from other sources (e.g., online resources). | 0 = Teachers do not use digital content. 1 = Teachers use digital content, but the content is provided by the government, private EdTech providers, or other sources (e.g., online resources). 2 = Teachers create digital content themselves. |

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

| 3.1.6 | Teacher-driven creation of learning content: What type of digital content is created by teachers? | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: Which of the following types of digital content are you able to create for teaching? Please select all that apply. (a) PowerPoint slides/slideshow presentation (b) Interactive content (c) Graphs or charts (d) Videos (e) Online assessments | 1 = Basic content (e.g., PowerPoint slides/slideshow presentation, Word documents) 2 = Advanced content (e.g., interactive content, graphs/charts, videos) |

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.
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</table>
| 3.1.7 | Teacher-driven creation of learning content: Proportion of teachers creating online assessments | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: Which of the following types of digital content are you able to create for teaching? Please select all that apply.  
(a) PowerPoint slides/slideshow presentation  
(b) Interactive content  
(c) Graphs or charts  
(d) Videos  
(e) Online assessments | Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |
| 3.1.8 | Types of advanced digital activities teachers engage their students in: Do teachers engage their students in creative activities via digital media? | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: I engage my students in the following creative activities: (Please select all that apply.)  
(a) Creating something using digital tools (programming, design content, etc.)  
(b) Solving problems using digital tools and resources  
(c) Experimenting with collaborative digital tools individually and/or in groups  
(d) Collaborative group projects that involve planning and evaluation  
(e) None of the above | 0 = No.  
1 = Teachers engage students in creating something using digital tools (programming, design content, etc.).  
2 = Teachers engage students in solving problems using digital tools and resources.  
3 = Teachers engage students in experimenting with collaborative digital tools individually and/or in groups.  
Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |
| 3.1.9 | Types of advanced digital activities teachers engage their students in: Do teachers engage their students in research activities via digital media? | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: I demonstrate how to conduct online research in the following ways: Please select all that apply.  
(a) Finding information related to a task or assignment on the Internet  
(b) Determining whether an online source is reliable  
(c) Producing a report by synthesizing (combining) information from various online sources  
(d) None of the above | 0 = No.  
1 = Teachers engage students in finding information related to a task or assignment on the Internet.  
2 = Teachers engage students in determining whether an online source is reliable.  
3 = Teachers engage students in producing a report by synthesizing (combining) information from various online sources.  
Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |
### Table A3 continued

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<tbody>
<tr>
<td>3.2</td>
<td>Equipment/Software</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2.1</td>
<td>Access to devices for integrating EdTech into teaching and assessment: Proportion of teachers with access to a computer, laptop, or tablet at home</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Which of the following devices do you have access to at home? Please select all that apply. (a) Smartphone (b) Tablet (c) Computer/laptop (d) TV (e) Radio (f) None</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.2.2</td>
<td>Access to devices for integrating EdTech into teaching and assessment: Proportion of teachers with access to a smartphone at home</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Which of the following devices do you have access to at home? Please select all that apply. (a) Smartphone (b) Tablet (c) Computer/laptop (d) TV (e) Radio (f) None</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Access to devices for integrating EdTech into teaching and assessment: Proportion of teachers with access to a computer, laptop, or tablet at school</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Which of the following devices do you have access to at school/university/TVET institution? Please select all that apply. (a) Smartphone (b) Tablet (c) Computer/laptop (d) TV (e) Radio (f) Smartboard (digital whiteboard) (g) Projector (h) None</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.2.4</td>
<td>Internet access for integrating EdTech into teaching and assessment: Is mobile Internet highly accessible to teachers?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: How often do you have access to each of the following Internet sources? Please answer all that apply. (a) Mobile (3G/4G) [Never, Rarely, Occasionally, Often, Always] (b) Home (broadband speeds) [Never, Rarely, Occasionally, Often, Always] (c) School/university/TVET institution (broadband speeds) [Never, Rarely, Occasionally, Often, Always] (d) Community access point [Never, Rarely, Occasionally, Often, Always]</td>
<td>0 = Never/Rarely 1 = Occasionally 2 = Often 3 = Always Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>No.</td>
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<td>Data Source</td>
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<tr>
<td>3.2.5</td>
<td>Internet access for integrating EdTech into teaching and assessment: Is broadband Internet at home highly accessible to teachers?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: How often do you have access to each of the following Internet sources? (Please answer all that apply.)&lt;br&gt;(a) Mobile (3G/4G) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(b) Home (broadband speeds) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(c) School/university/TVET institution (broadband speeds) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(d) Community access point [Never, Rarely, Occasionally, Often, Always]</td>
<td>0 = Never/Rarely&lt;br&gt;1 = Occasionally&lt;br&gt;2 = Often&lt;br&gt;3 = Always&lt;br&gt;Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.2.6</td>
<td>Internet access for integrating EdTech into teaching and assessment: Is broadband Internet at school/university/TVET institution highly accessible to teachers?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: How often do you have access to each of the following Internet sources? Please answer all that apply.&lt;br&gt;(a) Mobile (3G/4G) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(b) Home (broadband speeds) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(c) School/university/TVET institution (broadband speeds) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(d) Community access point [Never, Rarely, Occasionally, Often, Always]</td>
<td>0 = Never/Rarely&lt;br&gt;1 = Occasionally&lt;br&gt;2 = Often&lt;br&gt;3 = Always&lt;br&gt;Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.2.7</td>
<td>Internet access for integrating EdTech into teaching and assessment: Are community Internet access points highly accessible to teachers?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: How often do you have access to each of the following Internet sources? Please answer all that apply.&lt;br&gt;(a) Mobile (3G/4G) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(b) Home (broadband speeds) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(c) School/university/TVET institution (broadband speeds) [Never, Rarely, Occasionally, Often, Always]&lt;br&gt;(d) Community access point [Never, Rarely, Occasionally, Often, Always]</td>
<td>0 = Never/Rarely&lt;br&gt;1 = Occasionally&lt;br&gt;2 = Often&lt;br&gt;3 = Always&lt;br&gt;Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.2.8</td>
<td>Internet access for integrating EdTech into teaching and assessment: Quality of Internet accessible to teachers (measured in terms of use cases enabled by the Internet connection)</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: The Internet in my school/university/TVET institution is appropriate for the following actions: Please select all that apply.&lt;br&gt;(a) Browsing websites&lt;br&gt;(b) Watching videos online&lt;br&gt;(c) Listening to audio online&lt;br&gt;(d) Downloading video and/or audio content&lt;br&gt;(e) Downloading documents (e.g., PDF, Word)&lt;br&gt;(f) None of the above</td>
<td>0 = Low quality&lt;br&gt;1 = Suitable for browsing websites&lt;br&gt;2 = Suitable for listening to audio online&lt;br&gt;3 = Suitable for watching videos online&lt;br&gt;4 = Suitable for downloading documents&lt;br&gt;5 = Suitable for downloading video and/or audio content&lt;br&gt;Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<td>3.3</td>
<td>Governance</td>
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<tr>
<td>3.3.1</td>
<td>What system is used to collect and analyze data on students and teachers?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What is the system being used (by the school and government) to collect and analyze data on students and teachers (performance data, attendance records, etc.)? (a) No such data collection system (b) Data needs to be input physically (e.g., by filling forms) (c) Data needs to be input into the system on a computer/device by someone (teacher or other staff) (d) Data automatically collected through integration with learning platform (e) Data automatically collected through integration with learning platform, and used to improve learning/design lesson plans</td>
<td>0 = No such data collection system 1 = Data needs to be input physically (e.g., by filling forms) 2 = Data needs to be input into the system on a computer/device by someone (teacher or other staff) 3 = Data automatically collected through integration with learning platform 4 = Data automatically collected through integration with learning platform, and used to improve learning/design lesson plans</td>
</tr>
<tr>
<td>3.3.2</td>
<td>Proportion of teachers that receive IT support</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Do teachers have IT support at your institution? (IT support is required to troubleshoot issues related to IT equipment and software.) (a) No, IT tasks are undertaken by teachers themselves. (b) Yes, there is IT staff that supports teachers.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.3.3</td>
<td>Extent of leadership support to teachers from educational institution</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What kind of leadership support do you receive from your school/university/TVET institution? (a) My institution supports me in trying out new ways of teaching with digital technologies. (b) My institution actively encourages me to improve my teaching with digital technologies. (c) My institution incentivizes me to participate in the development of my institution’s digital strategy. (d) I do not receive any leadership support from my institution.</td>
<td>0 = Teachers do not receive any leadership support from their institution. 1 = Their institution supports teachers in trying out new ways of teaching with digital technologies. 2 = Their institution actively encourages teachers to improve their teaching with digital technologies. 3 = Their institution incentivizes teachers to participate in the development of the institution’s digital strategy.</td>
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</table>

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.
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<tr>
<td>3.4</td>
<td>Community Support</td>
<td></td>
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<tr>
<td>3.4.1</td>
<td>Proportion of teachers that are part of online communities of practice</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Are you part of online communities of teachers aimed at sharing and exchanging ideas, experiences, and best practices in teaching or EdTech delivery? (a) No (b) Yes</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Is there a formal platform to facilitate knowledge sharing and community creation among teachers? (e.g., DIKSHA platform in India)</td>
<td>Economist Impact research</td>
<td>This indicator assesses the maturity of the digital learning ecosystem for teachers by asking if there exist formal platforms for them to exchange knowledge and best practices that go beyond informal, ad hoc communities (e.g., temporary social media groups).</td>
<td>0 = No 1 = Yes</td>
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<tr>
<td>4</td>
<td>Students and Parents</td>
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<tr>
<td>4.1</td>
<td>Digital Capability of Students</td>
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<tr>
<td>4.1.1</td>
<td>Level of digital skills among students</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What is the level of digital literacy among students? Please select all that apply. (a) Students can use communication tools (e-mail, messaging, video calling). (b) Students can store and organize files on a computer. (c) Students can complete and submit online assessments. (d) Students can browse the Internet to find relevant educational content. (e) Students can operate productivity applications (e.g., MS Office suite). (f) Students can use collaborative online applications and shared folders (such as Google Drive, Dropbox). (g) Students do not have any of the above digital skills.</td>
<td>0 = No digital skills. 1 = Students can use communication tools (e-mail, messaging, video calling). 2 = Students can store and organize files on a computer. 3 = Students can complete and submit online assessments. 4 = Students can browse the Internet to find relevant educational content. 5 = Students can operate productivity applications (e.g., MS Office suite). 6 = Students can use collaborative online applications and shared folders (such as Google Drive, Dropbox). 7 = Students are familiar with programming languages (e.g., C++, Java, Python).</td>
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### Appendix 3

#### Table A3 continued

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<tr>
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<tr>
<td>4.1.2</td>
<td>Have students been taught/trained to use the digital tools required for online education? (includes online learning platforms, communication tools, or other digital tools used by the school for online education)</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Have students been taught or trained to use the digital tools required for online education? (includes online learning platforms, communication tools, or other digital tools used by the school for online education) (a) No, most students are unable to use these tools. (b) No, but most students are self-taught. (c) Yes, students have been taught/trained to use these tools by the school/university/TVET institution.</td>
<td>0 = No, most students are unable to use these tools. 1 = No, but most students are self-taught. 2 = Yes, students have been taught/trained to use these tools by the school/university/TVET institution. Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>4.1.3</td>
<td>Proportion of students receiving data privacy, ethics, and safety training</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What do you teach your students regarding digital safety, privacy, and ethics while using EdTech? Please select all that apply. (a) Using antivirus/malware programs (b) Managing privacy settings (c) Ethical and socially responsible online behavior (examples of unethical behavior include plagiarism or cheating, impersonation, stealing, and unauthorized access to devices or information) (d) Protecting sensitive personal data (e) Protection against cyberbullying and cybercrimes (f) None of the above</td>
<td>0 = No, students do not receive any of the below trainings. 1 = Students receive at least one training. 2 = Students receive at least two trainings. 3 = Students receive at least three trainings. 4 = Students receive more than three trainings. Trainings include: (a) Using antivirus/malware programs (b) Managing privacy settings (c) Ethical and socially responsible online behavior (examples of unethical behavior include plagiarism or cheating, impersonation, stealing, and unauthorized access to devices or information) (d) Protecting sensitive personal data (e) Protection against cyberbullying and cybercrimes Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>4.2</td>
<td>Connectivity and Devices at Home</td>
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<tr>
<td>4.2.1</td>
<td>Student access to devices for learning: Proportion of students that have access to a computer, laptop, or tablet at home</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Which of the following devices do most students have access to at home? Please select all that apply. (a) Smartphone (b) Tablet (c) Computer/laptop (d) TV (e) Radio (f) None (g) Not sure</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>4.2.2</td>
<td>Access to devices for learning: Proportion of students that have access to a smartphone at home</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Which of the following devices do most students have access to at home? Please select all that apply. (a) Smartphone (b) Tablet (c) Computer/laptop (d) TV (e) Radio (f) None (g) Not sure</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>4.2.3</td>
<td>Access to devices for learning: Proportion of students that have access to TV or radio at home</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Which of the following devices do most students have access to at home? Please select all that apply. (a) Smartphone (b) Tablet (c) Computer/laptop (d) TV (e) Radio (f) None (g) Not sure</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>4.2.4</td>
<td>Do students have their own devices or share with family members, and does this interfere with their online education?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: Do students own devices or borrow them from family members, and does this interfere with their online education? (a) Most students do not own devices, and this interferes with delivering online education. (b) Most students do not own devices, but there is always a device available to ensure smooth delivery of online education. (c) Most students own devices.</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<tr>
<td>4.3</td>
<td>Online Access to Curriculum Content</td>
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<tr>
<td>4.3.1</td>
<td>Is the relevant curriculum content accessible as well as suitable for online use?</td>
<td>Economist Impact Teachers’ Survey 2021</td>
<td>The survey question corresponding to this is: What are the issues faced by students in accessing learning content online? (Includes digitized textbooks, videos, presentations, audio files, reading material, images and graphics, etc. provided by the government or other providers) Please select all that apply. (a) Relevant curriculum content is unavailable online. (b) Content is not easy to download/inaccessible due to technical issues (large file size, etc.).</td>
<td>Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.</td>
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<td>(c) Content is not suited for digital use (e.g., scanned textbook pages).</td>
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<td>(d) Quality of the content is an issue: students find it difficult to understand due to the way it is presented.</td>
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<td></td>
<td>(e) Students do not face any issues in accessing learning content.</td>
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### 4.4 Communication

#### 4.4.1 Do teachers have online communication channels with parents and students?

Economist Impact Teachers’ Survey 2021

The survey question corresponding to this is: Are there communication channels between teachers and students and parents (social media messaging groups, etc.)? If yes, what are these used for? Please select all that apply.

(a) No, there are no such groups.
(b) Yes, groups are used for information and updates.
(c) Yes, groups are used to administer homework assignments.
(d) Yes, groups are used to receive feedback from parents on teaching and the overall online education experience.
(e) Yes, groups are used to communicate with parents regarding student performance and other concerns.

0 = No.
1 = Yes, but they are used for basic purposes such as conveying information and updates.
2 = Yes, and they are used to administer homework assignments.
3 = Yes, and they are used to receive feedback from parents as well as communication with them regarding student performance and other concerns.

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

### 5 Providers

#### 5.1 e-Learning Systems

Economist Impact Teachers’ Survey 2021

The survey question corresponding to this is: What platform do you use to conduct classes? Please select all that apply.

(a) I do not use any platform.
(b) Government online education platform
(c) Other online learning platforms (e.g., Google Classroom, Edmodo, Edubuntu, Khan Academy, etc.)
(d) Social media (e.g., YouTube, Facebook, Telegram, WhatsApp)
(e) Television
(f) Video calling platforms (e.g., Zoom, Google Meet)

Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

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| 5.1.2 | Use of private EdTech platforms by teachers: Proportion of teachers using private EdTech platforms to communicate with students and/or share digital content | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: What platform do you use to communicate and/or share digital content with students? Please select all that apply. If the answer is (c), please write the name of the platform.  
(a) I do not use any digital platform.  
(b) Government online education platform  
(c) Other online learning platforms (e.g., Google Classroom, Edmodo, Edubuntu, Khan Academy) (Please write the name of the platform.)  
(d) Social media (e.g., YouTube, Facebook)  
(e) Social messaging application (e.g., Telegram, WhatsApp)  
(f) Online file sharing (e.g., Dropbox, Google Drive, Xender)  
(g) E-mail | Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |

5.2 Online Content

5.2.1 Proportion of teachers using content designed by private EdTech providers | Economist Impact Teachers’ Survey 2021 | The survey question corresponding to this is: Do you teach using digital content? Who provides/creates this content? (Includes digitized textbooks and other multimedia content) Please select all that apply.  
(a) I do not use digital content.  
(b) Content is created by me.  
(c) Content is provided by the government.  
(d) Content is from private EdTech providers.  
(e) Content is from other sources (e.g., online resources). | Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |

5.3 Integrators, Emerging Technology

5.3.1 Workforce educated in ICT as a percentage of total tertiary workforce | ILOSTAT | This indicator measures the digital learning preparedness of the country from a labor force perspective. A workforce educated in ICT fields provides a strong foundation for the technical skills and know-how needed for successfully developing digital learning initiatives, including learning platforms. | Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data. |

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### 5.4 Partners/Sponsors

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<tr>
<td>5.4.1</td>
<td>Has the government signed an MOU or partnered via other collaborative means with multilaterals/private sector/other agencies to promote EdTech? (e.g., in the form of curriculum design, EdTech platform roll-out, capacity building of educators, others)</td>
<td>Economist Impact research</td>
<td>This question aims at understanding the synergies between the government and other stakeholders, particularly with private providers, in the digital learning ecosystem. A country can receive a positive score if there is evidence of MOUs or other agreements toward shared goal(s) (e.g., EdTech platform, curriculum design, teacher training, device access, etc.).</td>
<td>0 = No. 1 = At least one MOU/collaboration/partnership. 2 = More than one MOU/collaboration/partnership.</td>
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</table>

The government may sign an MOU or partner via other collaborative means with multilaterals/private sector/other agencies to promote EdTech (in the form of curriculum design, EdTech platform roll-out, capacity building of educators, others).  
[Note: An MOU for the education sector with a focus on or mention of EdTech should also qualify. One could most likely find these in news articles or MOE website.]  
Linear transformation of data values to scale 0–100, where 100 = most digital education readiness. Minimum and maximum thresholds are calculated from the minimum and maximum data values recorded across all countries in the publicly available data.

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**Notes:**
- **1.** In this publication, “$” refers to United States dollars.
- **2.** ADB recognizes “Vietnam” as Viet Nam.
- **3.** A set of background indicators is included to understand and contextualize the index results better. These are not a part of the ranking calculations.

**Source:** Economist Impact Research. 2021.
Toward Mature Digital Education Ecosystems
The Digital Education Readiness Framework

Introducing a data-driven framework aimed at closing the digital education gap, this report assesses 10 developing member countries (DMCs) and illuminates how a multi-stakeholder, systemic approach—including engagement with the private sector—can enhance the delivery of digital education. Utilizing five overarching categories of the framework—infrastructure, government policy, educators, students, and service providers—as lenses to examine each country’s unique landscape, the report identifies tailored pathways for incremental and staged development. The report envisages adopting sustainable, scalable solutions that contribute to a more cohesive and inclusive digital education ecosystem.

About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members—49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.