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G20 INDONESIAN
PRESIDENCY
EDUCATION
WORKING GROUP

REPORT



RECOVER TOGETHER,
RECOVER STRONGER
THROUGH EDUCATION

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Disclaimer

This report was prepared by the G20 Education Working Group and submitted to the G20 Education Ministers' meeting on 1 September 2022.

It has been referenced in the Chair's Summary issued by the Indonesian G20-presidency on 1 September 2022.

The examples presented in the tables are not exhaustive of the practices undertaken by the G20 countries.

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Acronyms and abbreviations

AI	Artificial Intelligence
CONFEMEN	The Conference of Ministers of Education of the Francophonie
CSO	Civil Society Organization
ECCE	Early Childhood Care and Education
EU	European Union
G20	The Group of Twenty
G20 EdWG	G20 Education Working Group
ICT	Information and Communication Technology
ILO	International Labour Organization
SDG	Sustainable Development Goal
STEM	Science, technology, engineering and mathematics
TVET	Technical and Vocational Education and Training
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
WB	World Bank

Executive Summary

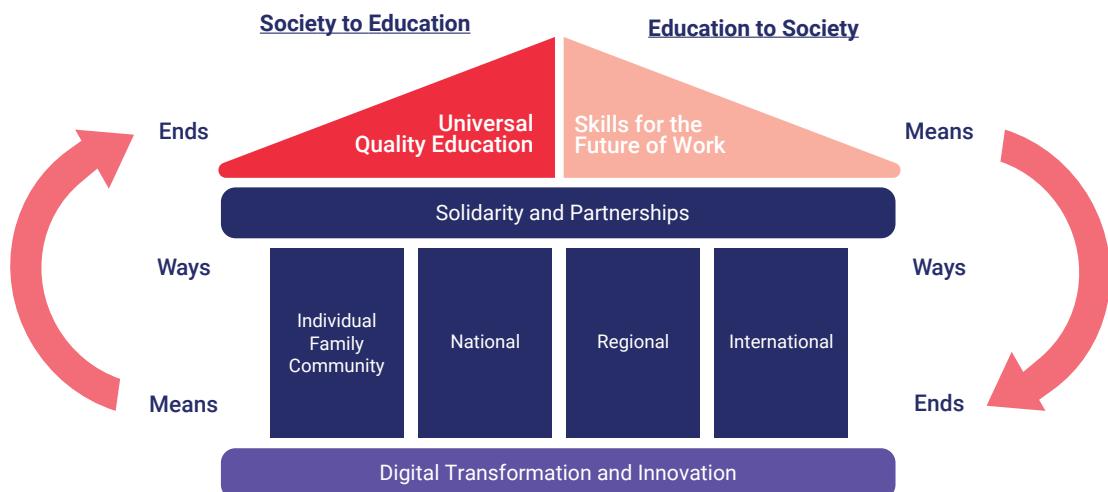
The educational policies of the Group of Twenty (G20) are of global significance, as the group's 19 countries and the European Union together represent two-thirds of the world's population, 80 per cent of its economic output and 75 per cent of its trade. Given the varied size, income levels and regions of the 2022 G20 member and invited countries, an analysis of recent changes in educational policies and programming sheds significant light on the global direction of education reform, shaped as it is by numerous crises and the third year of the COVID-19 pandemic.¹

Educational realities have changed significantly in the year since the G20 Italian Presidency of 2021. This time last year, efforts to vaccinate the population against COVID-19 dominated political agendas, and education systems continued to respond to surges in infection rates with partial and full school closures.

In the year since, programmes and policies have largely transitioned from crisis response to short- and long-term recovery measures, with the aim of building education systems back stronger, together.

The G20 Indonesian Presidency identified four priority areas for the submission of survey responses: (i) Universal Quality Education; (ii) Digital Technology; (iii) Solidarity and Partnerships; and (iv) Future of Work. The report adopts a visual framework to analyse the ways in which these priority areas interact and influence one another. The Government of Indonesia put solidarity and partnerships at the core of its G20 Presidency education agenda, since the concept of mutual assistance, or *gotong* (work) *royong* (together), is an intrinsic feature of Indonesia's approach to development.

Visualizing the analytic framework for G20 education policies and programmes



¹ The G20 members are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, the Republic of Korea, the Russian Federation, Saudi Arabia, South Africa, Türkiye, the United Kingdom, the United States and the European Union. Spain is invited as a permanent guest. This year's Indonesian Presidency has also invited Cambodia, the Netherlands, Rwanda, Singapore and the United Arab Emirates to participate, along with a number of regional and international organizations.

Based on survey responses, the report describes three major trends. Overall, the G20 countries expanded their commitments to:

- 1.** Strengthening school and community networks and instilling inclusion principles in education to promote the participation of students and communities who face disadvantages due to gender, diversity, disability, geography, poverty or incarceration, or intersections of any of these states
- 2.** Leveraging the use of digital technology and connectivity to improve educational access, quality, inclusion and relevance to the future of work in an age in which datafication and digitalization determine national and international agendas
- 3.** Supporting inclusive lifelong learning by developing education systems that give every child a high-quality early start and ensure smooth school-to-work transitions in a world marked by economic and environmental uncertainty.

The Indonesian Presidency has called on G20 countries to **RESET** by resisting and rectifying the widening disparities in academic achievement, health and well-being that were exposed and exacerbated by pandemic disruptions. **RESET**, or **R**ecover together, **S**trengthen **E**ducation, and **T**ransform for the Future, is a call for G20 countries to reach, retain and re-engage every learner in effective learning environments that build strong foundational skills, psychosocial well-being and pathways to success in school, work and the wider community. It calls on countries to take immediate action to close both pre-pandemic and pandemic-generated gaps in educational access, experiences and outcomes. It is also a call for togetherness and for transformation, for *gotong royong* to guide the development of innovations and partnerships that enable every person to learn, work and develop sustainably.

International cooperation and solidarity, knowledge sharing and peer learning will be critical. This is in line with the message of the United Nations Transforming Education Summit², which demonstrates the international community's concerted efforts to help shape a more peaceful, inclusive, gender equal and sustainable future for humanity and the planet.

Background

The Group of Twenty (G20) is a leading forum of major economies that seeks to develop global policies to address the world's most pressing challenges. Collectively, the G20 members account for two-thirds of the world's population, 80 per cent of its economic output and 75 per cent of its trade.

Building on the legacy of previous G20 summits, and in light of the new situation created by the COVID-19 pandemic, the Indonesian presidency has moved forward the international discussion on education and identified four priority areas that form part of educational policy recovery and the transformation of education: (i) Universal Quality Education; (ii) Digital Technology; (iii) Solidarity and Partnerships; and (iv) Future of Work.

Overall objectives

The Indonesian presidency has drafted a report on policy responses related to these four priorities for the G20 Education Working Group (G20 EdWG). The report presents and discusses promising practices shared by G20 countries and aims to guide other countries as they seek to make changes to their education systems.

Scope of the report

This report is the result of sustained guidance and support from the G20 EdWG and internal experts at UNESCO. It includes data and reports from G20 countries, mostly derived from G20 surveys undertaken from February to April 2022. Other findings have been taken from databases and relevant literature, and, where appropriate, UNESCO Institute for Statistics (UIS) data sets. All G20 members and invited countries were requested to complete the survey to inform this report and associated discussions. The surveys were completed by a total of 19 members of the G20, including the European Union, and by invited countries. At the time of the report's writing, 26 responses to the survey had been received. Assessed collectively, the survey results provide a broad understanding of the field, from which emerge implications for the present and the future.

² The Transforming Education Summit (TES) will be convened by the Secretary-General during the 77th UN General Assembly in September 2022. The Summit will seek to mobilize political ambition, action, solutions and solidarity to transform education: to take stock of efforts to recover pandemic-related learning losses; to reimagine education systems for the world of today and tomorrow; and to revitalise national and global efforts to achieve SDG-4.

Introduction

The Group of Twenty (G20) is an intergovernmental forum made up of some of the world's leading economies, seeking to work together to coordinate policy and address the world's major challenges. The G20 members are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, the Republic of Korea, the Russian Federation, Saudi Arabia, South Africa, Türkiye, the United Kingdom, the United States and the European Union. Spain is also invited as a permanent guest. Each year, the Presidency invites guest countries to take full part in the G20 exercise. Under the Indonesian G20 Presidency in 2022, the invited countries are Cambodia, the Netherlands, Rwanda, Singapore, Spain and the United Arab Emirates. Several international and regional organizations also participate, ensuring the forum represents a wide cross-section of the world's countries.

The Indonesian Presidency recognizes the importance of collective action among major advanced and emerging economies around the world in assuring the world's recovery from the COVID-19 pandemic. Therefore, building on the legacy of previous G20 summits, it has selected the theme of 'Recover together, recover stronger' to guide the direction of the forum's work. The forum will specifically focus on three main pillars: Global Health Architecture, Sustainable Energy Transition and Digital Transformation (see Box 1).

The focus on collaboration, expressed more broadly through the principles of solidarity and partnership, carries particular resonance in Indonesia, where the concept of *gotong royong* (mutual assistance) represents 'notions of moral obligation and generalized reciprocity', rooted in harmonious social relations motivated by an 'ethos of selflessness and concern for the common good' (Bowen, 1986). This concept, linked to community mobilization, has been an intrinsic feature of Indonesia's approach to development. Accordingly, the Government

of Indonesia has put solidarity and partnerships at the core of its G20 Presidency education agenda.

Working together on education is all the more important because the future growth and shared prosperity of G20 countries will be heavily influenced by the quality of their education systems, as captured in the learning outcomes they generate, their readiness to adjust to the future of work, their ability to galvanize the potential of technologies, and their capacity to nurture multistakeholder, multilevel cooperation and solidarity between schools, nations and the greater international community. Acting decisively to respond to the pandemic's effects on student learning and well-being could help mitigate the consequences of the crisis. G20 countries may also need to reassess the quality and equity of their education systems in light of lessons learned from the crisis, examining what has worked well and what may need to be strengthened and transformed to achieve national and international commitments.

This report examines education policy responses in G20 countries, beginning with an investigation of the toll of the COVID-19 crisis on learning. After framing the report in **Chapter 1**, the following chapters will explore the four priority areas of the G20 Indonesian Presidency: solidarity and partnerships at all system levels; universal quality education; digital technology; and skills for the future of work. **Chapter 2** examines the policy measures taken to support solidarity and partnerships between schools, nations and the greater international community. **Chapter 3** focuses on universal quality education, which is at the heart of the fourth Sustainable Development Goal (SDG 4) and explores the many emerging trends towards digital transformation. **Chapter 4** explores the ways in which countries are attempting to make education systems future-ready in alignment with the future of work. **Chapter 5** proposes policy recommendations for G20 countries.

Box 1: Synergies between Education, Digital Economy and Employment Working Groups

Under the G20 Indonesian Presidency, Working Groups on Digital Economy and on Employment have looked at key topics related to skills development and education. By sharing their insights, as well as those found by the Education Working Group, synergies can be determined.

Working Group of Digital Economy

The Digital Economy Working Group established under the Indonesian Presidency has focused on matters related to the facilitation of digital entrepreneurship, the reduction of the digital talent gap, and the practical operationalization of data flow and data sharing frameworks. The goal of this Working Group is to generate greater discussion on cross-cutting digital issues and encourage reflection on the ways that G20 economies can gain more significant economic benefits from digitalization, ensure that the digital economy is inclusive and sustainable, and understand the current and emerging challenges that digitalization entails.

Digital skills and digital literacy are also central to this Working Group, given their key role in closing the digital divide and improving digital inclusion. To achieve this, Indonesia's G20 Presidency believes that a clear, concrete and tangible foundation is needed to develop digital literacy and skills. Another goal of the Working Group involves increasing access to advanced digital technology and enabling the participation of vulnerable groups.

Three priorities for further discussion have been established. Firstly, ensuring sustainable economic growth towards a digital economy must involve long-term strategic planning for the entire digital economy ecosystem, including by improving digital connectivity. Secondly, to decrease the digital skills gap, the Indonesian Presidency has proposed the formulation of a G20 Toolkit for Measuring Digital Skills and Digital Literacy. And, thirdly, consideration needs to be given to ways to ensure that the use of data and digital identity in digital transactions is both effective and secure.

Working Group of Employment

The Employment Working Group under the Indonesian Presidency was designed to respond to cross-cutting challenges, such as the attainment of sustainable and inclusive global growth through the creation of quality jobs while also increasing labour productivity. This aligns with the need to ensure a skilled workforce. One of the priorities of the Employment Working Group this year is to think about the role of Community-Based Vocational Training (CBVT)³ in G20 countries and considering issues such as social capital, skills demand and job market features, particularly in rural areas.

The Indonesian Presidency has highlighted the fact that Technical and Vocational Education and Training (TVET) can be community-based, which opens up opportunities for more demand-driven skills development using a bottom-up approach from the community to the training provider. Also, the flexibility of TVET is at the core of the Working Group's discussions, since the ability to adapt quickly can make it an appropriate approach to accelerate economic recovery.

Training development should consider the skill needs and developments in the world of work, which means that discussions should consider the multidimensional nature of these components. Furthermore, given that rapid developments in technology and globalization are influencing the skills needed in the labour market, the optimization of the use of information technology in educational programmes will be discussed. The changing nature of the labour market means that individuals need to continuously develop and strengthen their skills. A lifelong learning approach can help people to remain challenged and motivated to innovate.

Finally, the Employment Working Group has set as a priority identifying and collecting policy recommendations from discussions among delegates and engagement groups to create accessible, quality and sustainable Community-Based Vocational Training as a part of a lifelong learning strategy, while seeking possible partnership opportunities to address technical issues within G20 members.

³ The Community-Based Vocational Training (CBVT) is an inclusive model that addresses human capacity building at local level and can ensure productivity and value addition and strengthens the local economy. It encourages the participation of the community and rebuilds trust in institutions given its close proximity to the population, promotes local development and the social and solidarity economy given its decentralised feature, encourages local entrepreneurship to boost the local economy, involves non-government actors through local social dialogue, and assures that no one is left behind in the effort to recover together stronger.

1.

From Response to Recovery

The COVID-19 pandemic has taken a substantial toll on learning and well-being worldwide. The education systems of all G20 countries have been affected, but to varying degrees, depending on the severity of the pandemic in each country, the level of pre-COVID system preparedness and the effectiveness of policy responses. Even in countries where school systems have historically been effective and internet connectivity and infrastructure is widespread, learning disruptions were significant, especially for the most vulnerable populations. And in the many countries that had significant gaps in education access and outcomes before the pandemic, COVID-19 school disruptions have increased the complexity, intensity and urgency of the challenges they already faced. In these countries, coordinated effort will likely be required to address the disruption experienced by students, which risks turning the existing learning crisis into a generational catastrophe, especially for marginalized and vulnerable groups (UN, 2020).

G20 countries have taken action in light of the urgent need for effective and immediate recovery responses. This section will briefly outline the current picture of pandemic impacts in G20 countries.

1.1 Assessing COVID-19 impacts on education: challenges and responses

The pandemic has had short-term and longer-term impacts on learners, teachers and education systems. The short-term impacts include abrupt changes in modalities of teaching and learning; loss of learning; and declines in well-being. Longer-term impacts on individuals include disruptions in lifelong learning journeys, especially for disadvantaged groups; economic losses for individuals and economies; difficulties in career trajectories; disengagement from learning; and early school-leaving. Longer-term impacts on school systems include changing pedagogical methods; a deepened

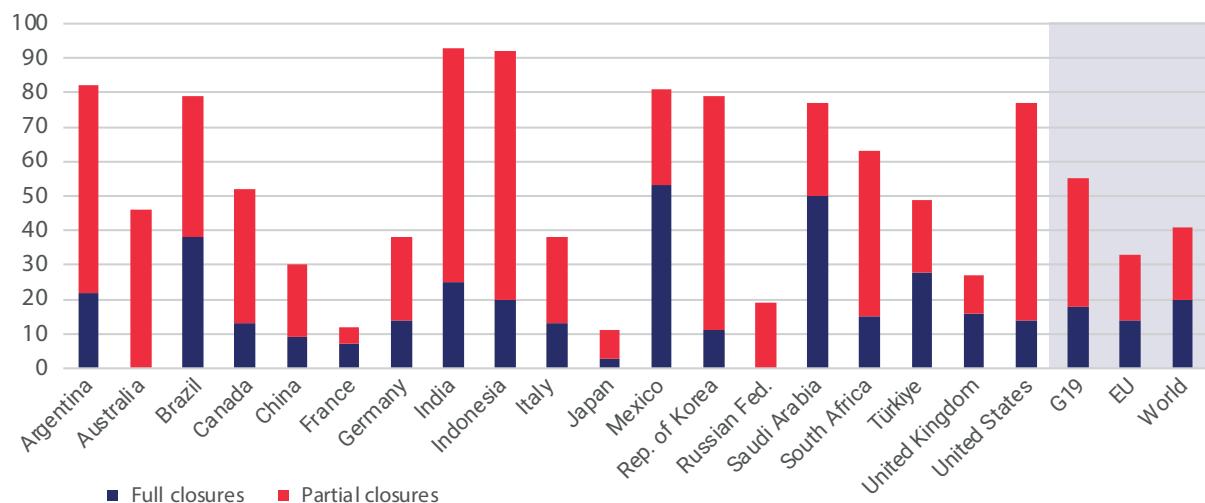
integration of digital technology in teaching and learning experiences; curriculum reforms to strengthen digital skills and literacies; the need for adapting schools and learning spaces including improvement of school sanitation measures such as hand sanitation and hygiene and buying extra personal protective equipment (PPE); and increased coordination between education and businesses, among others.

To address these short- and long-term impacts, many G20 countries have implemented specific programmes to target pandemic-triggered declines in academic achievement, health and well-being, schools and learning spaces. However, G20 countries, and the international community more broadly, are facing challenges in assessing the scale of these impacts due to gaps in internationally comparable, rigorously collected data – which means that the full scale of the impact of COVID-19 will probably not emerge for another few years.

Continuity of learning challenges

The G20 countries, along with other countries of the world, made efforts to minimize learning disruption by trying to keep schools at least partially open when possible. Although schools are now open in most countries around the world, some education systems continue to operate at partial attendance and make use of hybrid modes of teaching and learning to respond to pandemic health protocols. As of 20 April 2022, schools are partially open in 3 out of 19 G20 countries and are fully open in all others. Globally, an estimated 70 million students worldwide, or 5 per cent of the global student population, are still not attending school in person.

Since the outbreak of the pandemic, UNESCO has monitored the status of the schooling system across the world on a daily basis, taking account of school closures and selected delivery modalities. As Figure 1 illustrates, only 6 out of 19 G20 countries had nationwide full closures longer than the world average duration of 20 weeks.

Figure 1: Duration of school closures in G20 countries, March 2020–March 2022 (weeks)

Source: UNESCO school closure tracker.⁴

To streamline and simplify health responses in schools during different waves of COVID-19, many G20 countries devised traffic light or level-based response systems. In some countries, such as **Brazil**, **France** and **Mexico**, systems that used levels or colours corresponding to a specific set of measures helped to create an element of predictability and enabled teachers to better plan for their school year, term, month or even week, depending on how quickly the situation was changing at the time.

For the 2021/2022 academic year, **France** designed a four-level strategy based on the level of transmission (incidence per 100,000),⁵ with each level corresponding to different degrees of in-person and online instruction, sanitation protocols and social distancing. **Brazil's** traffic light system has levels referred to as Blue, Green, Yellow and Red. Decisions based on these levels are delegated to local authorities. For example, Yellow refers to outbreaks in local clusters, during which most schools remain open but local authorities can choose to close a select few. Red signifies community transmission, and local authorities take a risk-based approach in determining whether to close schools. In **Mexico**, the traffic light

system was issued at national level by the Ministry of Health and helped guide teacher unions. Beginning at green and rising to yellow, orange and red, an agreement was made that return to schools would not happen until the system was fully green, which explains the long school closures in the country, as shown in Figure 1.

Teaching and learning

One of the challenges in assessing the pandemic's effect on learning is the lack of first-hand, internationally comparable information collected in a systematic and scientific manner, which is needed to evaluate the extent to which teaching and learning have been challenged as a result of the current crisis. No comparative international assessments have been carried out since the beginning of the pandemic. However, substantial losses in math and reading have been documented in a number of low-, middle- and high-income countries. Emerging evidence and estimations from countries like **Brazil**, **Italy**, the Netherlands, Mexico and others show the stark differences in performance between current and pre-pandemic cohorts (see Table 1).

⁴ This graph presents the average (in weeks) of full and partial closures at the country level. Within many G20 countries, the duration of school closures varied across regions and localities.

⁵ French Ministry of Education, 2022, Coronavirus Covid-19 : mesures pour les écoles, collèges et lycées pour l'année scolaire 2021-2022, available at <https://www.education.gouv.fr/covid19-mesures-pour-les-ecoles-colleges-et-lycees-modalites-pratiques-continuite-pedagogique-et-305467>.

Table 1: Evidence of learning losses in some G20 countries

COUNTRY	SCALE OF LEARNING LOSSES
Brazil	Based on a research conducted combining administrative, with natural experiments for the timing of school closures and reopenings in the State, it is estimated that São Paulo students learned only 28% of what they would have learned if face-to-face classes had continued.
India	In rural Karnataka, only 16% of grade 3 students could perform simple subtraction in 2020, compared to nearly 24% in 2018.
Indonesia	In April–May 2021, INOVASI and MoECRT Center for Policy Research assessed student learning outcomes in 69 panel schools and 3,391 early grade students from 7 districts. Compared to their pre-pandemic scores, learning progress one year into the pandemic had decreased by 0.47 standard deviation (SD) in literacy (equivalent to 6 months of learning progress) and 0.44 SD in numeracy (equivalent to 5 months of learning progress).
Mexico	Significant learning losses in basic numeracy and literacy were found according to socioeconomic status.
Netherlands	Students lost the equivalent to 20% of a school year.
South Africa	Grade 2 students incurred learning losses equivalent to up to 70% of a year of learning.

Source: UNESCO, UNICEF and World Bank, 2021, The State of the Global Education Crisis: A Path to Recovery, Washington, D.C., World Bank; INOVASI and MoECRT Center for Policy Research, 2021, Learning Recovery: Time for Action, Policy Brief, Jakarta, INOVASI and MoECRT.

UNESCO, in partnership with other international organizations, has conducted two cross-country surveys. The Monitoring Impact on Learning Outcomes (Milo) survey was designed to assess the impact of COVID-19 on learning outcomes in Africa in reading and mathematics. The Responses to Educational Disruption Survey (REDS) was conducted in partnership with the International Association for the Evaluation of Educational Achievement (IEA) and the European Commission. It collected information from governments, school principals and some teachers and students on how well countries and, in particular, schools were prepared for distance learning in times of school closures and during the subsequent reopening phase, as well as on measures implemented to provide all students with the opportunity to continue learning.

These and other studies demonstrate that the potential long-term impact of COVID-19 school disruptions on learning is severe. Missed learning opportunities disproportionately impacted the most marginalized and vulnerable populations. Groups most affected were the youngest learners, girls, children with disabilities, and students from socio-economically disadvantaged households with no access to internet connectivity or internet-capable devices. During school closures, child labour, domestic violence and child marriage increased. Some of the progress made towards gender equality over

the last decade is at risk of being reversed: 10 million more girls are at risk of early marriage and of dropping out of school (UNICEF, 2021).

Although high-income countries were more able to quickly organize remote learning through online platforms, emerging evidence indicates that COVID-19 school closures resulted in learning losses when compared to pre-pandemic levels, with disadvantaged students disproportionately affected (UNESCO, UNICEF, World Bank, 2021). Most G20 countries opted to cancel or defer national assessments. As a result, few G20 countries have a complete data set, and many have no assessment data to measure learning disruption.

To halt the progression of learning losses and accelerate learning recovery, UNICEF, UNESCO and the World Bank (2022) joined forces to provide guidance and support to countries navigating the crisis through the RAPID Recovery Framework:

➔ **Reach every child and retain them in school:** As schools reopen, it is crucial to monitor children's re-enrolment and develop early warning systems to identify and intervene with students at risk of dropping out. Strengthening educational management information systems to achieve real-time and individualized monitoring with disaggregated data can help track students most at risk.

👉 **Assess learning levels:** To accelerate learning recovery, learning assessments must become regular, timely and inclusive of all children, reaching those who are often excluded or under-represented. In this effort, large-scale national assessments will be important, as will classroom-based assessments (understanding students' individual learning levels through the use of diagnostic assessments and gathering information on students' learning progress through formative assessments).

👉 **Prioritize teaching the fundamentals:** Even before the pandemic, most national curricula were characterized as overambitious. To accelerate recovery, countries can consolidate curricula across and within subjects, with priority given to the knowledge and skills that are prerequisites for further learning, including foundational learning such as literacy, numeracy and basic social-emotional competencies. Priority should also be given to essential missed content, which can be identified through assessments of current levels of learning.

👉 **Increase catch-up learning and progress beyond what was lost:** Education systems will need to adopt empirically proven catch-up and remedial programmes with contextually appropriate strategies to accelerate learning recovery. Effective strategies include targeting instruction by grouping students by level of proficiency; using digital technology with adaptive teaching; self-guided learning; small group tutoring; and extending instruction time.

👉 **Develop psychosocial health and well-being so every child is ready to learn:** Focusing on the health and well-being of children not only contributes to increased attendance and retention but is also essential to enable children to be ready to learn. In many countries, schools offer safe spaces from violence, as well as healthy meals, mental health services and psychosocial supports.

Effective implementation of the RAPID Framework will require sustained financing and relevant professional development training and support for teachers.

The learning recovery process will be a multi-year and multi-phase endeavour, as countries will need to both recover learning losses and address pre-existing learning gaps. Recovery strategies should be supported by structural education reforms to address these challenges. In this way, the learning recovery period can serve as a

crucial first step towards educational transformation.

Social-emotional health and well-being

School protocols during COVID-19 had an enormous impact on student socio-emotional well-being, as the REDS survey showed. In addition to the health uncertainties generated by the pandemic, many students felt lonelier and were worried about the ways in which the disruption impacted their learning and the potential effect on their future educational and work trajectories. Teachers' well-being also suffered, with many teachers reporting concerns about catching COVID-19 at work (IEA-UNESCO, 2021). The RAPID Framework makes specific reference to the importance of supporting teachers' well-being because teachers are a key factor in students' well-being and learning recovery.

Some countries took specific measures to provide psychosocial support to teachers and learners, making socio-emotional well-being a national priority. The **Indian** government set up the helpline MANODARPAN to provide psychological support for the mental health and well-being of Students during the COVID-19 outbreak and beyond.⁶ **Mexico** has identified threats to socio-emotional well-being as a visible challenge to both students and teachers as a result of the pandemic.⁷ In particular, the alarming increase in levels of violence against children has been a motivating factor in the development and roll-out of different forms of socio-emotional support.

Specific examples of interventions to support socio-emotional well-being can be found at school level in a number of countries. In the **Russian Federation**, where studies showed 83.8 per cent of students had experienced some negative psychological effects as a result of distance learning,⁸ the education ministry set up a helpline and issued specific recommendations for students, including video calls with friends, talking to their parents and limiting new intake of information.⁹ In the **Republic of Korea**, psychological counselling services were offered to schools and were focused on students affected by anxiety and depression due to prolonged periods of distance learning. Guidelines were also developed for all educators on psychosocial care in infectious disease management.¹⁰

⁶ Indian Ministry of Education, 2021, available at <https://manodarpan.education.gov.in/>.

⁷ Interview with officials from the Public Education Secretariat, Mexico.

⁸ A. Savvateev, 2021, Explosive distant learning, Russian Academy of Science, available at <http://www.ras.ru/digest/shownews.aspx?id=42de160d-4613-451e-a777-403bb5e60537&print=1>.

⁹ Russian Ministry of Education, 2020, Recommendations for Psychologists in the Education System Amid the Spread of a New Coronavirus Infection (COVID-19), available at <https://docs.edu.gov.ru/document/82e053bc2468d77ec62cd82affaddc9/download/2763/>.

¹⁰ UNICEF and UNESCO, 2021, *Republic of Korea Case Study*, available at <https://www.unicef.org/eap/media/9416/file/Republic%20of%20Korea%20Case%20Study.pdf>.

Economy and implications for education

The pandemic had a dramatic impact on the global economy, including in G20 countries. After a deep recession in 2020, global growth is expected to moderate from 5.9 per cent in 2021 to 4.4 per cent in 2022 (IMF, 2022). Global growth is expected to slow to 3.8 per cent in

2023. Soaring fiscal deficits and public debt may represent a threat to macroeconomic stability and the public funding of education and training (see Table 2). UNESCO, UNICEF and the World Bank (2021) estimate that this generation of students now risks losing \$17 trillion in lifetime earnings at present values as a result of school closures, or the equivalent of 14 per cent of today's global GDP – far more than the \$10 trillion estimated in 2020.

Table 2: Macroeconomic indicators for G20 countries, 2019–2023¹¹

Country	GDP Growth rate (per cent)					Fiscal balance (per cent of GDP)					Public debt (per cent of GDP)				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Argentina	-2	-9.9	10.2	4	3	-4.4	-8.6	-4.6	-3.8	-3.2	88.8	102.8	80.6	74.4	74.3
Australia	2	-2.2	4.7	4.2	2.5	-4.4	-8.6	-7.7	-5.2	-3.4	46.8	57.8	59.8	60	62.6
Brazil	1.2	-3.9	4.6	0.8	1.4	-5.9	-13.3	-4.4	-7.6	-7.4	87.8	98.7	93	91.9	92.8
Canada	1.9	-5.2	4.6	3.9	2.8	0	-11.4	-4.7	-2.2	-0.8	87.2	117.8	112.1	101.8	100.4
China	6.0	2.2	8.1	4.4	5.1	-6.1	-10.7	-6	-7.7	-7.1	57.2	68.1	73.2	77.8	81.8
European Union	1.6	-6.4	5.3	2.8	2.3	-0.6	-7.2	-5.5	-4.3	-2.5	78.8	91.8	90.3	89.3	87.5
France	1.8	-8.0	7.0	2.9	1.4	-3.1	-9.1	-7	-5.6	-3.8	97.4	115.1	112.3	112.6	112.9
Germany	1	-4.6	2.8	2.1	2.7	1.5	-4.3	-3.7	-3.3	-0.7	58.9	68.7	70.2	70.8	67.7
India	3.7	-6.6	8.9	8.2	6.9	-7.5	-12.8	-10.4	-9.9	-9.1	75.1	90.1	86.7	86.9	86.6
Indonesia	5.0	-2.1	3.7	5.4	6	-2.2	-6.1	-4.6	-4	-2.9	30.6	39.7	42.8	42.7	42.6
Italy	0.5	-9	6.6	2.3	1.7	-1.5	-9.6	-7.2	-6	-3.9	134.1	155.3	150.8	150.6	148.7
Japan	-0.2	-4.5	1.6	2.4	2.3	-3	-9	-7.6	-7.8	-3.5	236.1	258.9	263.1	262.5	258.3
Rep. of Korea	2.2	-0.9	4	2.5	2.9	0.4	-2.2	-0.6	-1.6	-1.1	42.1	48.9	49.8	52	53.3
Mexico	-0.2	-8.2	4.8	2.0	2.5	-2.3	-4.4	-3.8	-3.2	-3.2	53.3	60.3	57.6	58.4	58.9
Russian Fed.	2.2	-2.7	4.7	-8.5	-2.3	1.9	-4.0	0.7	-4	-5.3	13.7	19.2	17	17.8	18.9
Saudi Arabia	0.3	-4.1	3.2	7.6	3.6	-4.4	-11.3	-2.4	5.5	4.7	22.5	32.4	30	24	24.5
South Africa	0.1	-6.4	4.9	1.9	1.4	-4.7	-9.7	-6.4	-5.8	-6.1	56.3	69.4	69.1	70.2	73.4
Türkiye	0.9	1.8	11	2.7	3	-4.7	-5.1	-3.5	-6.9	-7.5	32.7	39.5	41.6	43.7	45
United Kingdom	1.7	-9.3	7.4	3.7	1.2	-2.2	-12.8	-8	-4.3	-2.3	83.8	102.6	95.3	87.8	82.7
United States	2.3	-3.4	5.7	3.7	2.3	-5.7	-14.5	-10.2	-4.8	-4	108.8	134.2	132.6	125.6	123.7

Source: International Monetary Fund, World Economic Outlook database, April 2022.

¹¹ This table reports GDP growth, fiscal balance, and public debt only and does not reflect public funding to education and training.

Investing in education will be vital to driving inclusive recovery and transforming education. Stimulus packages mobilized by G20 countries could provide substantial amounts for this purpose. Countries for which data is

available (see Table 3) have invested in a wide range of measures, including infrastructure, digitalization, skilling and equity targets.

Table 3: Use of education stimulus packages

Use of Education Stimulus	Australia	Brazil	Japan	Republic of Korea	Russian Federation	Saudi Arabia
Enhancing sanitation measures		Yes	Yes	Yes	Yes	
Introducing or expanding remote learning		Yes	Yes	Yes		Yes
Upskilling or reskilling training	Yes					
Supporting the most marginalized		Yes	Yes		Yes	
Supporting other areas		Yes	Yes	Yes	Yes	Yes

Source: UNESCO, 2021.

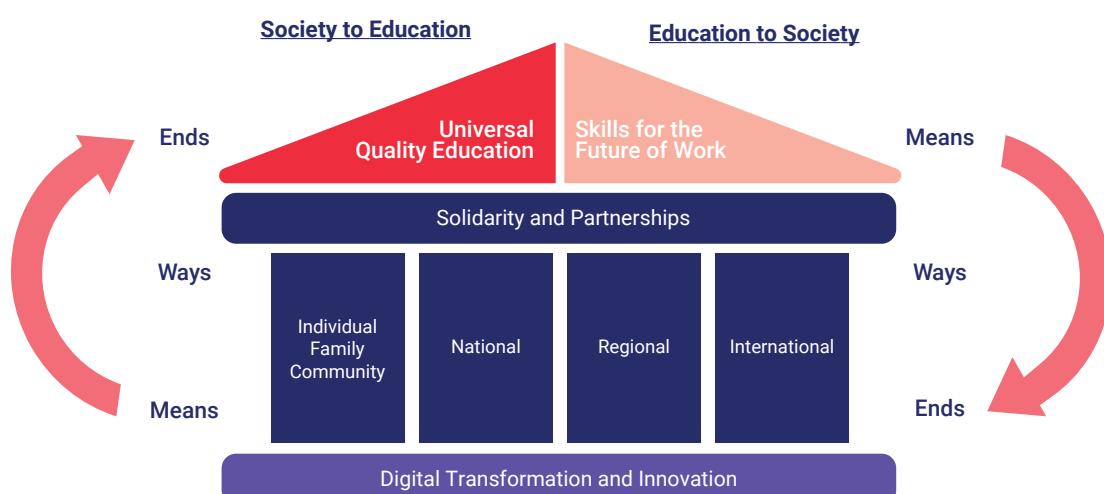
In conclusion, COVID-19's impact on education has been termed a generational catastrophe for good reason. The world has witnessed abrupt changes in modalities of teaching and learning, loss of learning and declines in well-being, with negative consequences including economic losses for individuals and economies, difficulties in career trajectories, disengagement from learning and early school-leaving. Mitigating the short- and long-term impacts is a key priority for G20 countries and other countries around the world. As the remainder of this report will show, accelerating learning recovery efforts toward achieving universal quality education and skills for future jobs will require enhanced solidarity and strong

partnerships, as well as sustained and effective use of digital technologies.

1.2 The priority areas of G20 Education System Strengthening

The G20 Education Working Group outlined four priority areas for strengthening education systems: (a) universal quality education, (b) digital transformation and innovation, (c) solidarity and partnerships, and (d) skills for the future of work. These pillars do not stand in isolation; they are interrelated, and the many links

Figure 2. Visualizing the analytic framework for G20 education policies and programmes



between them offer the framework for this report's analysis, as visualized in Figure 2 below.

The visualization in Figure 2 frames recovery as a schoolhouse made up of the four axes of the G20 EdWG priority areas for building back stronger, together. *Digital Transformation and Innovation* is placed at the base of the structure, since this feeds into nearly every policy in every programme reported. At the top stand the two targets of system strengthening efforts: *Universal Quality Education* and *Skills for the Future of Work*. *Solidarity and Partnerships* is situated at the centre of the schoolhouse, supported by four columns to represent the local, national, regional and international levels.

Each G20 EdWG priority area assumes a role as either *ends*, *ways* or *means*, depending on whether it is viewed from the perspective of Education or Society. The left of Figure 2 illustrates what Society can contribute to Education, and the right envisions what Education can give to Society.

Following the **left-side flow**, the means (Digital Transformation and Innovation) and the ways (Solidarity and Partnerships) lead to the ends (Universal Quality Education and Skills for the Future of Work).

On the **right side**, the means and ends switch, meaning that Universal Quality Education and Skills for the Future of Work can spur innovation and digital transformation.

Solidarity and Partnerships stand at the **centre** of the schoolhouse as ways, at the core of the nexus bridging the ends and means. Regardless of the directionality of the flow, they remain the way to means and ends, for without strong and sustained partnerships between sectors and stakeholders at all levels, the core targets of G20 policy and programme efforts to strengthen education systems (Universal Quality Education and Skills for the Future of Work) cannot be achieved.

This analytical framework is used to structure the chapters of the report. With the exception of Digital Technology, each priority area identified by the Indonesian presidency is addressed in its own chapter, beginning with Solidarity and Partnerships, then Universal Quality Education, and ending with the Future of Work. Due to the relevance and importance of digital technology to most programmes and policies reported across all priority areas, Digital Transformation and Innovation is addressed throughout all chapters, with particular focus in section 3.6. Like the schoolhouse visualized above, the strength or weakness of any one priority area implicates the stability of the overall system. Therefore, this report positions these priority areas as parts of a cohesive, holistic effort to move forward and recover, by strengthening education systems and aligning them to the future of work.

2.

Strengthening solidarity and partnerships

The COVID-19 pandemic has put education systems under a lot of pressure. But all over the world, collaborative responses have exemplified resilience and reciprocity. Teachers have shared best practices for distance learning with their peers and have maintained contact with students and families beyond the call of duty. Parents have worked hard to partner with teachers and to balance their careers with the need to support their children's continued learning at home. Corporate social responsibility has flourished, with telecommunications companies making online educational content free to access and establishing information-sharing platforms. And inter-sectoral partnerships between governments and civil society, the private sector and international organizations have emerged to help rebuild the education sector in the pandemic's aftermath.

As the 2021/2 *Global Education Monitoring Report* stressed, education is a social endeavour to which state and non-state actors are expected to contribute. The Indonesian constitution also says that education is built through collaboration. In this process, the partnerships formed may be based on a rational calculation of the direct costs and benefits of common action. However, actors can also display solidarity that is motivated not by short-term, individual calculations, but by the potential long-term benefits for the community, or by sheer altruism. While partnership and solidarity are intrinsically related, they are not identical.

2.1. The Indonesian spirit of *gotong royong*¹²

The spirit of solidarity and partnerships has been deeply rooted in Indonesian culture for centuries. *Gotong royong* is an Indonesian term that describes joint activities to achieve an expected result. It derives from the words *gotong* (work) and *royong* (together) (Koentjaraningrat, 1984). It refers to a type of togetherness in society that manifests itself in the form of cooperation to complete a task, for personal and community interests. *Gotong royong* is the mechanism by which a community has enthusiasm for and an established practice in overcoming difficulties and solving problems together. It represents a collective spirit among neighbours that strengthens economic and social resilience (Suwignyo, 2019), and traditionally applies in the event of a disaster, or when working on crops or building public facilities, such as roads, bridges, irrigation canals and even schools. Even today, there are villages in Indonesia where people heavily rely on the *gotong royong* of their neighbours for assistance in building their houses.

The official foundational philosophical theory of Indonesia, *Pancasila*, was laid down by the country's founding father, Soekarno, in 1945. It has five precepts – but Soekarno declared that if those five precepts were to be squeezed into one principle, it would be *gotong royong*. According to Soekarno, the Indonesian nation was built on the value of togetherness in the spirit (Bowen, 1986). Through *gotong royong*, solidarity and cooperation in solving problems can be achieved even in the midst of ethnic, religious and cultural differences.

¹² J. Bowen, 1986, On the political construction of tradition: Gotong Royong in Indonesia, *Journal of Asian Studies*, Vol. 45, No. 3, pp. 545–561; K. Kobayashi, 2004, Some aspects of institutionalized Gotong Royong: The enhancement of neighborhood associations, RT/RK in Jakarta 1954–1955, *Southeast Asia History and Culture*, Vol. 33, pp. 26–58; A. Suwignyo, 2019, Gotong royong as social citizenship in Indonesia, 1940s to 1990s, *Journal of Southeast Asian Studies*, Vol. 50, No. 3, pp. 387–408.

Gotong royong is not only a spontaneous activity; it has also been institutionalized in various aspects of the management of public life (Kobayashi, 2004). For example, *gotong royong* forms the basis for the informal administrative entities known as Rukun Warga (hamlet unit) and Rukun Tetangga (neighbourhood unit). These ‘government units’ manage citizen affairs on a small scale and on a voluntary basis: leaders are democratically elected and funding is obtained from citizen contributions.

Furthermore, many government programmes, both central and local, specifically provide for involving other stakeholders in their implementation. Several programmes run by the Ministry of Education, Culture, Research and Technology, for example, are based on the spirit of *gotong royong*, including the Centre of Excellence Vocational High School programme, which encourages industrial partners to help improve the quality and relevance of vocational education; the Pioneer Communities programme, which encourages the involvement of community organizations in generating good practices for improving school quality; and the Teaching Campus programme, which allows university students to become teachers in various elementary and junior high schools in order to improve learners’ literacy and numeracy skills.

During the pandemic, the practice of *gotong royong* emerged in a variety of activities. For example, people formed groups to provide food and medicine for those who were self-isolating. People also raised funds for medical workers as a form of moral support for their efforts. *Gotong royong* has also grown through digital networks, where campaigns build solidarity through various social media, and fundraising is carried out online.

2.2. How should we define solidarity and partnerships in education?

The pandemic has negatively affected students from vulnerable groups, who had difficulties accessing education and participating in online learning due to lack of access to technical infrastructure. Teachers and administrative staff faced the same difficulties and challenges as students, and had to adapt quickly to provide educational services to students. Collective effort is critically needed to respond to the pandemic’s impacts on education. The application of the concept and philosophy of *gotong royong* can act as a bridge for cooperation between G20 member countries to help overcome adversity and find solutions to the problems

that the pandemic has caused. The *gotong royong* perspective reminds us that in order to rebuild the education sector, we must work together to produce quality education that is inclusive for all and to build quality human resources to protect the future of our nations.

The concept of solidarity is embedded in global citizenship education, which is a focus of SDG target 4.7. Among the three dimensions of global citizenship education, solidarity features under the social and emotional dimension, which is meant to instil ‘a sense of belonging to a common humanity, sharing values and responsibilities, empathy, solidarity and respect for differences and diversity’ (UNESCO, 2015). The importance of solidarity in and through education towards achieving a common goal is recognized in the Universal Declaration of Human Rights, which acknowledges that ‘every individual ... shall strive by teaching and education to promote respect for these rights and freedoms’.

A sense of solidarity and shared responsibility can mobilize actors to join forces and work together, in partnership, to overcome education challenges. Solidarity and partnerships can form the basis of more resilient and effective education systems. In their response to a questionnaire from the G20 Presidency, Member States submitted their perspective on collaborations in education and policies that showcase their approaches to partnerships and solidarity in education. The analysis below has grouped them at three levels: local, national and international. The analysis, among other questions, considers how education systems foster solidarity; how partnerships in education can help build solidarity and for what purposes; and to what extent solidarity in education can transform educational practices, enrich learning experience and improve learning outcomes.

2.3. Solidarity and partnerships at local and school level

In principle, solidarity and partnerships can be manifested in:

- ➔ *How school members support each other*, through collaboration between teachers and students, student body initiatives or teacher communities of practice
- ➔ *How schools support, or are supported by, their communities*, including parents, local authorities and businesses (both informally or formally, such as through representation in school boards), in committing to common goals, mobilizing resources or enhancing

opportunities for work-based learning (e.g. internships and apprenticeships).

Responses did not fall neatly under these two categories. Instead, the examples provided by Member States showed their commitment to:

- ➔ Strengthening school and community networks
- ➔ Instilling inclusion principles in education.

As the **United States** noted, communities benefit when schools open their doors to parents, families and neighbours seeking academic, health and social support. Such coalitions can set and achieve community-specific goals, ranging from kindergarten readiness to access to vision, health and dental care and to improved graduation rates. Through these partnerships, new and innovative ways can be identified to tackle issues that affect communities and the country as a whole.

School and community networks

To foster and improve family participation in school life, **Brazil** has established a Family and Education programme which aims to provide financial support to schools, create development projects for teachers and families, strengthen school boards and ensure broader access to the Clique Escola mobile app. This app promotes transparency and community participation by enabling people to access financial and educational information on 180,000 public and private schools. In 2021, the Family and Education programme financed action plans for more than 4,500 schools and in 2022 more than 17,000 action plans will be funded.

Germany has aimed to foster inclusion through building school networks. Schule macht stark (School makes you strong) is a joint initiative between the federal and state governments to support primary and lower secondary schools in disadvantaged areas, improve learning opportunities for disadvantaged students and contribute to educational equity. During the first phase (2021–2025), 13 research institutes and universities work closely with teachers and principals from 200 schools to identify opportunities for school and classroom development and to build a network of schools and other service institutions in the area. During the second phase (2026–2030), schools will pass on their new strategies to other schools.

In the **Netherlands**, initiatives focus on creating links between schools, the wider community, and other government and non-government stakeholders. As part of the Equal Opportunities Alliance, an initiative launched in 2016, the government cooperates with schools, social organizations and over 100 municipalities, taking different

approaches depending on local needs and challenges. Local initiatives are supported with knowledge, data, research and financial backing to go beyond education and connect the different environments in which children live: school, home and their local surroundings. This network-centric approach enables different actors to work on equal opportunities within their respective realms and from various local contexts. For instance, public libraries provide all children with the opportunity to read.

Saudi Arabia has a strategic objective to enhance family involvement in preparing for their children's future. Both the community and family are major contributors in the Human Capability Development Program's Ecosystem. The program has a dedicated portfolio focusing on actively engaging parents.

Spain provides financial support to promote school partnerships in different autonomous communities and cities through the development and implementation of common projects over two school years. Following an annual call for proposals, grants are awarded to public schools, including special education centres, from early childhood to upper secondary education, as well as to adult education and public centres which offer specialized education such as language, artistic or sports education. The programme aims to enhance equity and inclusion, reduce school segregation, promote innovation and research initiatives, consolidate collaborative educational networks, contribute to the development of key competences for lifelong learning, develop the ability to work in teams, train students in digital and virtual learning environments, and open up education systems to the outside world.

Inclusion

Many countries have set up programmes to promote and facilitate the inclusion of students and communities who face disadvantages, whether due to gender, ethnicity, disability, geography, poverty, incarceration, or intersections of any of these states. In **Australia**, for example, the government is working with Aboriginal and Torres Strait Islander organizations, communities and services on the design and delivery of Connected Beginnings, a collective impact initiative which aims to provide children and their families with holistic support and access to support services. Australia has also reviewed its Disability Standards for Education and recognized the need to empower students with a disability by ensuring they are better informed of their rights, as well as to support schools to better understand and meet their obligations. The government is working with disability and education organizations and with education

authorities to develop information products and to embed accountability to meet the standards.

In **Canada**, the federal, provincial and territorial governments across the country work with youth-serving organizations to help students stay in school, graduate on time and access post-secondary education by providing after-school tutoring sessions, mentoring programmes, mental and social wellbeing services and bursaries and scholarships. They also create volunteering opportunities with organizations that serve communities to promote inclusivity, conservation and civic and democratic engagement. The federal Canada Student Financial Assistance Program provides targeted grants and needs-based loans to eligible students enrolled in post-secondary education programmes. In addition, a Repayment Assistance Plan helps borrowers who are facing financial difficulty to repay their loans, with special schemes for students with disabilities. The federal government also provides funding for outbound student mobility.

In **India**, the Samagra Shiksha scheme (Integrated Scheme for School Education) is a comprehensive programme of interventions aiming to implement the recommendations of the National Education Policy 2020 to deliver quality education. These include infrastructure development, foundational literacy and numeracy, inclusive education, innovation, financial support for teachers, digital initiatives, support for uniforms and textbooks, early childhood education, vocational education, sports and physical education and teacher education. The programme has a special focus on eliminating gaps in enrolment, retention and learning based on gender, caste, ethnicity, religion and disability. Activities will be concentrated in about 500 special focus districts. As part of Samagra Shiksha, the National Initiative for School Heads' and Teachers' Holistic Advancement aims to develop the capacity of 4 million teachers, school leaders, faculty members of State Councils of Educational Research and Training and of District Institutes of Education and Training, and officials from Block Resource Centres and Cluster Resource Centres in all states and union territories. The first expected outcome is improved learning, but the initiative will also develop inclusive classroom environments, teacher responsiveness to students' social, emotional and psychological needs, the use of art as pedagogy for increased creativity and innovation, and activity-based learning to move away from rote learning.

Japan has a new learning support system for higher education, which supports low-income households so that students do not have to abandon their studies due to financial difficulties. It is targeted at students attending universities, junior colleges, colleges of technology and

vocational schools. Beneficiaries are exempt from tuition and receive scholarships.

Mexico has renewed a collaboration agreement with the Undersecretariat of the Penitentiary System of Mexico City to offer youth and adults deprived of liberty the opportunity to continue their upper secondary education in 15 penitentiary centres in the city.

Saudi Arabia's Human Capability Development Program will make high-quality learning accessible to all through an inclusive approach that will offer opportunities to specific learner segments such as gifted students and those with disabilities. Children will be provided with learning experiences that help them develop a resilient knowledge base through providing innovative educational experiences, tailored to the needs of each child, particularly, students with disabilities, as well as gifted students by professional teachers.

In **Spain**, the PROA+ programme for guidance, progress and educational attainment in schools of special educational complexity, including in rural areas, aims to support schools that are committed to adapting their educational projects to the needs of the students. These schools have many students who are educationally vulnerable and face personal and social obstacles throughout their school career, which limit their opportunities to benefit from classroom teaching and school resources. Schools that enter into collaboration agreements with local education authorities commit to offering an open, stimulating place for personalized learning in order to reduce early school-leaving. Spain has also established guidance units for educationally vulnerable students within the educational or psycho-pedagogical services of school areas and districts. These units will accompany students during their educational trajectory, designing acceleration pathways to help them fulfil their potential, strengthening links between families and educational centres and collaborating with other community resources to reduce absenteeism and early school-leaving. The units will also help improve cooperation between different learning frameworks and promote multiple learning approaches to facilitate educational transitions and support the development of essential interpersonal, communication and cognitive skills.

In England (the **United Kingdom**), one of the priorities is 'Families.' Programmes under the 'Families' priority aim to support the most disadvantaged and vulnerable children and youth through providing high-quality local services and ensuring the best start in life through quality early education and childcare that can raise educational

standards and help parents to work. Among a range of intended outcomes some examples are special support to children in 12 Opportunity Areas; the Holiday Activities and Food programme of support during school holidays; support for working families in paying for childcare costs; and a reform of the early years' foundation stage.

2.4. Solidarity and partnerships at national level

In principle, solidarity and partnerships can be manifested in:

- ➔ *How curricula mainstream solidarity*, interconnectedness and interdependence, compassion, ethics and empathy, and also how extra-curricular activities and volunteering are encouraged in education, noting the principles for a pedagogy of collaboration and solidarity suggested by the Futures of Education report (UNESCO, 2021)
- ➔ *How multi-stakeholder partnerships advance common goals in education*, including between different tiers of government, non-governmental organizations, academic communities, businesses and their associations, the media, parents and teacher unions, etc.

Responses showed Member State commitment to open participation in curriculum development and to developing partnerships to implement cross-sector reforms and strengthen the provision of early childhood, vocational and digital education.

Curriculum development

Several countries are redeveloping curricula in a way that better fosters the principles of interconnectedness and solidarity in order to help learners to face the challenges of the modern world as part of a broader, more connected society.

Canada's curriculum redesign efforts focus on including those who have historically been left out. The provincial and territorial governments are collaborating with underserved communities in curriculum redesign efforts to reflect their unique stories, histories and successes, which can better lead to successful curriculum implementation. Provinces and territories strive to establish collaborative partnerships with Indigenous communities and to support school authorities to build relationships and engage with parents and families of First Nations, Métis and Inuit students.

In accordance with the National Education Policy 2020 (NEP, 2020), National Curriculum Frameworks (NCFs) are being developed to streamline skills, TVET levels, and education levels from early childhood to higher education. This is intended to facilitate mobility across all education streams. For this, a comprehensive strategy has been

worked out jointly by the Ministry of Education (MoE), the Ministry of Skill Development and Training, and institutions, under both education departments of all states, as well as the industry and other stakeholders. Among the actions taken as part of this strategy is the implementation of State Focus Groups in 25 key areas. Consultations have taken place at the district level, and a mobile app survey has been conducted and position papers drafted. The whole process, including consultations and report preparation, is paperless, using a tech platform specially designed for the project by NCERT and NIC, MoE. A mandate document was released recently to bring about a paradigm shift in education with focus on holistic development of children, emphasis on skilling, vital role of teachers, learning in mother tongue, and cultural rootedness.

Under the Curriculum Framework for Excellence (CFE), curriculum development in the **United Arab Emirates** is constantly evolving to align with changing global market trends and labor demands; a new curriculum has been developed for birth-to-eight-years, Baraem Al Mustaqbal, which links with the CFE to ensure a shared language and that the same pedagogical principles underpin teaching and learning.

Mexico's process of curricular redesign aims for a greater focus on solidarity in student learning. The Common Curricular Framework for Upper Secondary Education includes socio-cognitive resources and socio-emotional learning to place the holistic development of adolescents and youth at the centre of the educational process. Four knowledge areas have been identified: communication, mathematical thinking, digital culture and historical consciousness. Developing skills in these areas will help students to exercise their citizenship to improve their living conditions and society, while enabling them to continue their education or enter the labour market. The curricular redesign is being carried out through a process of collaborative participation, under a coordinating group of 150 experts. Their proposals were submitted for a discussion process organized in 14 sessions and 2,800 working groups across the country, which engaged 70,000 teachers. The framework will be published in mid-2022.

For its part, **Spain** is focusing on responding to the world's most pressing challenge: climate change and the associated imperative of sustainable development. The Environmental Education for Sustainability Action Plan (PAEAS 2021–2025) was developed to promote a cultural change that can allow for an adequate response to contemporary socio-environmental challenges in a coordinated, participatory manner and with institutional and social co-responsibility, including the active and equal contribution of women as agents of change. During its first phase, priority lines of action were collected, incorporating a multisectoral and broad vision of environmental and sustainability education and leading

to a base document that gathered the visions, proposals and ideas of more than 300 experts. During the second phase, the plan was drafted, coordinated by an inter-ministerial working group, and was subject to a public consultation process.

Education reforms

Most education reforms require intensive collaboration: both horizontal, between ministries and sectors, and vertical, between central and local governments. **Indonesia**, for instance, is carrying out a transformation process of its education funding and governance mechanisms related to scholarships for poor students (PIP/KIP); assistance to schools, early childhood education centres and community learning centres (BOS and BOP); and tools to help schools manage assistance to implement their activity plans (ARKAS) and procure goods and services (SIPLah). Designing and implementing these mechanisms requires collaboration between various ministries (for example, education, finance, religious affairs and home affairs) and coordination among and within central and regional governments (at province, district and city level). At the regional level, local governments also need to collaborate with schools and communities, especially since communities provide education services through schools that are entitled to financial support.

Collaboration between central and local levels is key to the success of another reform currently under implementation in **Indonesia**, the Pioneer Schools programme. Its interventions begin in the development of human resources, from students and teachers to principals, and progress to learning, planning, digitization and mentoring by local governments. Quality is measured through student learning achievement in safe, comfortable, inclusive and enjoyable learning environments. The programme is being carried out in stages. It is projected to expand from 2,500 education units in 111 regencies/cities in 2021/22 to 20,000 units in 514 regencies/cities by 2023/24, and ultimately to 40,000 units.

The **Russian Federation** addresses issues of collaboration in the development of reforms through the Russian Expert Pedagogical Council, an advisory body that helps the Ministry of Education interact with the community of pedagogical experts to ensure coherence. Council members conduct expert assessments and work together to discuss draft decisions.

Another broad category of reform built on partnership involves strengthening the links between education institutions and industry. The **Republic of Korea** is in the

third phase of its Leaders in Industry–University Cooperation 3.0 (LINC 3.0) programme, which involves the development of a cooperative ecosystem organically connecting companies and universities, which is based on a competitive model whereby universities are selected through evaluation and public contests. As part of the programme, major courses are restructured to align them with the needs of new and high-tech industries, ultimately strengthening the flow of talent to start-ups through expanding industry participation in curriculum development. Furthermore, joint industry-university research and technology development are promoted via industrial cooperation centers (ICCs) established on campus.

Driven by the long-term objectives of developing globally competitive citizens, **Saudi Arabia** launched the Human Capability Development Program to provide citizens with the required skills, values, and knowledge to compete globally. The program includes more than 50 initiatives focusing on reforming education in the Kingdom. Among the most prominent initiatives are those focusing on kindergarten expansion; flexible and diverse journey; innovative learning experience and curriculum; teacher development; accountable and high standards education system; flexible market and appealing higher education and TVET programs; as well as providing practical and entrepreneurial experiences for students.

India's National Education Policy 2020 has made way for large-scale, transformational reforms in primary, secondary and tertiary education. The Policy proposes the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new system that is aligned with the aspirational goals of 21st century education, including SDG 4, while building upon India's traditions and value systems. Built on the foundational pillars of access, equity, quality, affordability and accountability, this policy is aligned to the 2030 Agenda for Sustainable Development and aims to make both school and college education more holistic, flexible, multidisciplinary, suited to 21st century needs and aimed at bringing out the unique capability of each student. Features of the policy include: an increased focus on early childhood care and education, as well as on TVET; an effort to bring early school leavers back to school; elimination of rigid separation between disciplines; multiple entry-exit paths and a greater research focus in higher education; the use of technology in every aspect of education; and improved governance. It recognizes ethical, human and constitutional values such as empathy, respect for others and respect for diversity, incorporating them into curriculum, pedagogy and policy. Community participation and voluntarism in education

are promoted through the Vidyanjali initiative, in which remedial classes are provided to students through volunteers.

Early childhood development

Countries make use of partnerships across sectors and levels of government to better provide early childhood education. In **Brazil**, the government aims to use public-private partnerships to support the achievement of the first goal of the National Education Plan to universalize early childhood education in preschools and expand early childhood education in nurseries. The Human Capability Development Program was developed to fulfill **Saudi Arabia**'s targets to increase the enrollment in kindergartens by promoting the expansion of kindergarten education, leveraging innovative teaching methods, reviewing and developing a curriculum focused on basic and future skills adapted to the age group, developing assessment tools, specific training for educators (teachers and principals), as well as setting requirements for kindergarten addressing the full ecosystem.

Australia's national government is collaborating with authorities at state and territory level to improve early childhood education. As part of the Preschool Reform Agreement 2022–2025, the government will make AUD 1.8 billion available to states and territories to ensure the delivery of preschool for 15 hours per week during the year before full-time school, based on new attendance targets and preschool outcome measures.

The Government of **Canada** has made a transformative investment to build a Canada-wide early learning and childcare (ELCC) system in partnership with provincial, territorial and Indigenous partners. A Canada-wide ELCC system will substantially improve the quality of life of thousands of low- and middle-income families across Canada currently struggling to find affordable, high-quality childcare. It will also help women to fully and equally participate in the labour force, in education and in public life. The programme also takes account of the fact that First Nations, Inuit and Métis are distinct peoples with unique needs, priorities and aspirations for their children. To support them, the Government of Canada is working with its provincial and territorial colleagues and Indigenous partners to co-develop and implement ELCC priorities that are Indigenous-led and culturally appropriate.

Italy, too, is working across different levels of government to ensure the implementation of its integrated Early Childhood Education and Care System Plan, which aims to define national guidelines, encourage families to take up education and care services, introduce a national register

of educational services for children under 3, monitor results, pilot self-assessment and increase availability of places, while also making school buildings more innovative, sustainable, safe and inclusive. A multilevel governance structure involves the central, regional and local authorities, each with specific and complementary competences in planning, implementation and monitoring.

Singapore's government-funded intervention services are guided by key principles that include family-centred practice, natural and inclusive environments, developmental appropriateness, functional and active child engagement and multidisciplinary team practice. In 2021, a cross-sectoral Inclusive Preschool Workgroup, set up to better support children with developmental needs in preschools, recommended the appointment of one inclusion coordinator per school, the expansion of existing developmental support programmes to more preschools, the enhancement of early childhood educators' capabilities in inclusive education and the timely and systematic identification of developmental needs. It also recommended that the Inclusive Support Programme (InSP) be piloted at selected preschools. The InSP aims to integrate the provision of early childhood and early intervention services within a preschool setting for children aged between 3 and 6 who require medium levels of early intervention support. The Government accepted these recommendations.

Technical and vocational education and training

The provision of technical and vocational education and training lends itself to cooperation between governments, institutions and social partners, and many countries use these natural linkages to build effective partnerships that benefit learners.

The strong relationship between government and social partners, including employer and employee representatives, is exemplified in **Germany**'s 2019 National Skills Strategy, which aims to create a new culture of continuing vocational and general education that makes lifelong learning a normal part of working life. The strategy helps improve access to different vocational training providers and funding opportunities, for instance through INVITE, a digital platform for vocational advanced training that links federal and state programmes.

Partnerships between government and the private sector are also important in TVET in England (**United Kingdom**), where as part of courses for T-Level technical-based qualifications, the government works closely with industry and employers to give young people the opportunity to

develop their practical and technical skills in a role directly relevant to their vocational course as an alternative to A-level academic qualifications. Employers are also involved in the development of apprenticeships, which give young people the chance to learn high level skills while earning at the same time. These links give employers the chance to ensure that young people are developing the skills and experience that industry needs.

Spain has introduced a new organic law on vocational education which is based on the principle of social partner participation, including businesses, in design, development, evaluation and innovation in training. The law also encourages small and medium-sized enterprise networks to rotate trainees to complement learning outcomes, introduces technological hubs and innovation clusters for these enterprises and creates a platform to exchange information and promote collaboration among schools, social partners, enterprises and associations. A national network of vocational education and training centres of excellence is planned to engage employer associations and trade unions.

Similarly, in **Türkiye**, sectoral centres of excellence are important to the country's TVET strategy. These centres aim to improve the quality of vocational and technical education by developing knowledge, skills and competencies in line with the European Quality Assurance Reference Framework for Vocational Education and Training and European Quality Assurance in Vocational Education and Training. Teacher and administrator training, improved learning environments, and increased cooperation between schools, social partners and the private sector all form part of the programme.

Meanwhile, in **Saudi Arabia**, there are two significant efforts to develop technical and vocational education and training. First is the Human Capability Development Program which focuses on aligning technical and vocational training with the labor market needs, working with the private sector to ensure maximum alignment to increase the enrollment in vocational education to ensure higher employability. The newly developed strategy of the Custodian of The Two Holy Mosques Scholarship Program that will enhance citizens' competitiveness through upskilling the human capital in new and promising sectors. The strategy consists of four paths with clear and specific objectives. The "Waed" path targets students pursuing vocational studies in the top 200 institutions. The second effort is the Strategic Partnerships Institutes programme which aims to evaluate the current status of entrepreneurship at units of the government's Technical and Vocational Training Corporation. It will develop up to 21 new curricula in entrepreneurship for vocational

programmes along with a full implementation plan. Coaching and mentoring of students are supported, since students will be encouraged to apply their qualifications in organizations.

Digital learning

As the pandemic has shown, digital learning often necessarily involves collaboration with stakeholders both within and outside government and education, including with the mobile operators who provide infrastructure for educational content. In **South Africa**, the Department of Basic Education has developed a Framework on Partnerships in ICT (Information and Communications Technology), which guides stakeholders such as the five major mobile network operators in providing connectivity, devices and teacher training as well as content distribution to all schools in the country. It has also signed memoranda with digital education content creators to make content available free of charge to learners and teachers and with the national broadcaster and regional stations to show lessons on television and radio. Both the national broadcaster and telecommunication providers collaborate with government in curriculum delivery and zero rating of education platforms.

France has developed sustainable and structural partnerships with private companies in trades and qualifications campuses and in digital education. **Australia**, too, is working to foster greater collaboration between government, industry and education institutions to rebuild more resilient and effective education systems that address labour market needs. One example is the industry-led Digital Skills Organisation, which works in collaboration with employers and training providers across Australia's digital sector to create and test approaches that will make vocational education and training more responsive to evolving industry and workforce needs.

Italy has built a National Coalition for Digital Skills, which has led to the creation of the National Strategy for Digital Competences. Its aim is to encourage schools to be more open to establishing laboratories for social and economic development, with community involvement, and to start small-scale experiments that ultimately build up to system level to bring about structural change.

In England (**United Kingdom**), the Digital Inclusion Strategy aimed to improve opportunities to access education remotely during school closures. It provided a range of resources to support schools and further education institutions. The government set up a knowledge base, Get Help with Remote Education, to

provide a one-stop-shop for teachers and school leaders, signposting available support packages, which includes a self-assessment framework, help to access technology that supports remote education, peer-to-peer training and guidance on how to use technology and resources effectively, and school-led webinars to support effective delivery of the curriculum. To support adults, the Department for Education introduced a digital entitlement for fully funded Essential Digital Skills qualifications (EDSQs) up to level 1. EDSQs have different objectives, reflecting the different learning needs, motivations and starting points of adults with no or low digital skills and ensure adults have the skills they need to use digital devices and progress in life and work.

2.5. Solidarity and partnerships at international level

The 2030 Agenda for Sustainable Development refers to mobilizing the means required for its implementation through a global partnership which is to be ‘based on a spirit of strengthened global solidarity, focussed in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people’ ([United Nations, 2015](#)).

Solidarity and partnerships can be manifested in:

- ➔ Cross-country initiatives to generate *shared purposes and common solutions* to educational challenges
- ➔ New forms of *regional and international cooperation*, especially South–South and triangular cooperation
- ➔ Enhanced accountability and coordinated advocacy towards meeting educational commitments and achieving educational improvements
- ➔ International development financing for low- and lower-middle-income countries
- ➔ Investments in global public goods, including data, evidence and knowledge.

One example of this kind of international cooperation is the **European Union**’s plan to establish the European Education Area by 2025, with a long-term vision of strengthening the resilience of European education and training systems and preparing them for the digital and green transitions, rooted in quality and inclusive education for all and across the life course. This strategic framework for European cooperation in education and training will support EU Member States in their education and training reforms and enhance synergies with other policy areas. Targets have been identified to monitor

progress, and three of the indicators are aligned with three of the SDG 4 benchmark indicators coordinated by the UNESCO Institute for Statistics and the Global Education Monitoring Report, thus improving the coherence between regional and global agendas.

Through 40 concrete actions and initiatives, the European Union supports mutual learning and cooperation on all levels, including in sharing good practices and developing new teaching methods and innovation. Resources have been made available through various programmes to achieve the European Education Area, including the Recovery and Resilience Facility and Erasmus+. The latter focuses on academic mobility and intra-university cooperation on curricula, training and governance to promote the internationalization of higher education. **Türkiye**, while not an EU Member State, is a member of the Erasmus+ programme and benefits from student and teacher mobility initiatives and from participation in education working groups.

The European Union also promotes education in its cooperation programmes and has committed to increasing the share of education in its development portfolio to 10 per cent, a threshold it may even exceed by 2027.

Another example of regional collaboration on higher education mobility is CAMPUS Asia (Collective Action for Mobility Program of University Students), which involves **China, Japan** and the **Republic of Korea**. The programme was launched in 2011 and has engaged over 10,000 students from 78 universities. The participating universities have now extended their cooperation to curriculum development, faculty mobility, credit recognition and degree awards.

South Africa collaborates on education with the Southern African Development Community, the Association for the Development of Education in Africa and the African Union. It has bilateral cooperation agreements on basic education with, among others, Angola and Kenya. It has also worked with the United Kingdom to implement the second phase of the University Staff Doctoral Programme to provide mobility opportunities for lecturers (through the Newton Fund) and to develop engineering education through university collaborations (with the Royal Academy of Engineering). With France, it works to support the Nurturing Emerging Scholars Programme for master’s studies in France, whereby graduates serve an academic internship at a historically disadvantaged university, and with Germany and the European Union, it works to support vocational education development.

France shared its expertise and technological resources during the pandemic by participating in the Imaginecole

digital platform. A result of ministerial dialogue led by the Conference of Ministers of Education of the Francophonie (CONFEMEN), Imaginecole brings together 10 countries to share resources for 6.6 million students and their teachers. Steered by UNESCO, within the framework of the Global Education Coalition, and with funding from the Global Partnership for Education and from France, the system relies on the expertise of Réseau-Canopé, Maskott and France Education International. It does not compete with national platforms but rather interacts with them, allowing teachers to create resources directly online, scripting them and publishing them on Imaginecole or on national platforms, in line with national curricula.

In **Canada**, provinces and territories have engaged on the international stage collectively through the Council of Ministers of Education Canada (CMEC), to obtain better information to strengthen and adapt their education systems to the global environment, as well as to facilitate the establishment of new partnerships. Table 4 provides details of regional and international programmes related to solidarity and partnerships.

2.6. Conclusion

G20 Member States and partner countries have demonstrated a varied understanding of the meaning of partnership and solidarity in education, based on the principles of SDG 4: universality, meaning that the agenda must be for all countries; inclusion, meaning that no one should be left behind; and linkages, meaning the need to collaborate across sectors. They have also showcased examples of partnership and solidarity at local, national and international levels. Many of the good examples are characterized by an awareness of the close links that need to be built between students, schools and their communities. They also provide evidence that good practice requires the engagement of as many stakeholders as possible to prevent the adoption of top-down solutions. Countries are increasingly willing to learn from others through strong cross-national networks.

Fewer countries appear to be working to instil the principle of solidarity in their curricula and teacher education programmes. Given that solidarity is a key element of SDG 4.7, which is becoming increasingly urgent in the face of the multiple challenges facing societies, this is an area in which more effort needs to be made.

Table 4. Programmes demonstrating solidarity and partnerships**ARGENTINA****Title:** Argentine Presidency in 2022 of the Community of Latin America and the Caribbean States (CELAC)**Beneficiary group/s:** Girls/women, linguistic minorities, those of low socio-economic status, those in rural areas, people from migrant backgrounds**Implementer:** The Ministry of Education of Argentina is in charge of the educational track, with the technical and political assistance of the Ministry of Foreign Affairs, International Trade and Worship**Short description:** CELAC is an intergovernmental mechanism for dialogue and political agreement created in 2010. Its membership includes the countries of Latin America and the Caribbean, who share a commitment to advance and balance the political, economic, social and cultural unity and diversity of the more than 600 million inhabitants of Latin America and the Caribbean. In 2022, the Ministry of Education of Argentina leads the educational working group meetings, and together, the Ministers of Latin America and the Caribbean are expected to reach a Declaration on Education.**Partnership/Collaboration:** Since its launch in December 2011, CELAC has strengthened dialogue between all the countries of the region. CELAC constitutes the central voice of the region, promoting Latin America and the Caribbean on the global agenda.**Digital technology:** Essential**CHINA****Title:** CAMPUS Asia (Collective Action for Mobility Program of University Students)**Beneficiary group/s:** Students, teachers and universities**Implementer:** Ministries of Education of China, Japan and the Republic of Korea**Short description:** Launched by the education ministries of China, Japan and the Republic of Korea, the CAMPUS Asia programme aims to promote the mobility of university students and strengthen quality collaboration and partnership among universities in the three countries. The programme was launched in 2012 and has engaged over 4,000 students from 39 top universities. Universities in the three countries have extended their cooperation to curriculum development, faculty mobility, credit recognition and degree awards.**Partnership/Collaboration:** The programme supports exchanges among China, Japan and the Republic of Korea, in a partnership that was developed to realize the consensus on education mobility reached by leaders of the three countries. Top universities in China, Japan and the Republic of Korea are involved in the programme.**Digital technology:** Somewhat unimportant

EUROPEAN UNION

Title: Erasmus+

Beneficiary group/s: Students, teachers and school staff

Implementer: European Commission or European Agency in Brussels, Erasmus+ National Agency

Short description: Erasmus+ is the EU's programme to support education, training, youth and sport in Europe. It provides funding for transnational cooperation in areas that drive forward the EU's policy agenda, and so supports priorities and activities set out in the European Education Area, the Digital Education Action Plan and the European Skills Agenda. The programme also supports the European Pillar of Social Rights, implements the EU Youth Strategy 2019–2027 and develops the European dimension in sport.

Erasmus+ offers mobility and cooperation opportunities in higher education, vocational education and training, school education (including early childhood education and care), adult education, youth and non-formal learning, and sport.

Partnership/Collaboration: The European side of the programme is open to all 27 EU Member States plus 6 other countries associated to the programme. The programme has a substantial international dimension, under which countries worldwide can work in partnership with one or more of the 33 Erasmus+ countries on mobility and cooperation projects.

Digital technology: Somewhat important

EUROPEAN UNION

Title: European Education Area (EEA)

Beneficiary group/s: Students, teachers, school staff

Implementer: European Commission (governed by a Strategic Framework with Member States)

Short description: The EEA aims to strengthen the resilience of European education and training systems and prepare them for the digital and green transitions, while ensuring quality and inclusive education for all and across the whole life course. Through 40 concrete actions and initiatives, the European Commission will support mutual learning and cooperation at all levels, sharing of good practices, development of new teaching methods and innovation in the area of education. EEA actions and initiatives are focused around five strategic priorities: improving quality, equity, inclusion and success for all in education and training; promoting lifelong learning and mobility; supporting teachers and trainers; supporting higher education; and promoting the green and digital transitions in education and training.

Partnership/Collaboration: The EEA initiative helps EU Member States work together to build more resilient and inclusive education and training systems.

Digital technology: Essential. Work is well under way to close the digital divide and address some of the most pressing societal issues linked to the digital transformation, such as proposing guidelines on fighting disinformation as well as on artificial intelligence and data use for educators. The Commission has adopted a proposal for a Council Recommendation on blended learning for high-quality and inclusive primary and secondary education, which aims to develop a shared vision and understanding of the approaches needed to ensure a mix of learning environments and tools that are effective, inclusive and engaging. In 2022, a proposal for a Council Recommendation on the enabling factors for successful digital education will be developed based on a strategic dialogue with Member States, and the Commission will propose a Council Recommendation on improving the provision of digital skills in education and training.

EUROPEAN UNION

Title: European Skills Agenda

Beneficiary group/s: School staff, people in work

Implementer: The European Commission, led by the Directorate-General for Employment (DG Employment)

Short description: The European Skills Agenda is a five-year plan to help individuals and businesses develop and use more and better skills, to aid recovery and further the EU's political priorities. With its 12 prescribed actions, it calls for joining up policies and approaches to ensure people have the right skills, provide supporting tools and initiatives, and unlock financing mechanisms. The Commission will support the acquisition of skills for the green transition under the programme.

Partnership/Collaboration: The Pact for Skills is a central part of the Agenda, bringing together private and public stakeholders that share the objective of up- and reskilling Europe's workforce to enable people to participate in the twin transitions. All these stakeholders will sign a Charter, co-created with stakeholders, which will define essential key principles, within their organizations and across their value chain or ecosystem. Four sectors are identified as priorities: Health, Construction, Automotive and Transport, and Tourism. The Pact also links in other EU initiatives for cooperation such as the Blueprint for Sectoral Cooperation on Skills, the European Alliance for Apprenticeships, and the Digital Skills and Jobs Coalition.

Digital technology: Essential. The Skills Agenda focuses on adult education to equip Europe's workforce with the skills to face the challenge of the digital transition, both at work and in daily life.

FRANCE

Title: The digital educational platform *Imaginecole*

Beneficiary group/s: Students, teachers, those of low socio-economic status and those in rural areas

Implementer: UNESCO (with the help of French Educational Digital and Expertise Agencies: Réseau-Canopé, ed tech Maskott and France Education International (FEI))

Short description: A result of a ministerial dialogue led by the Conference of Ministers of Education of the Governments and States of the French-speaking countries (Francophonie CONFEMEN) during the pandemic, the *Imaginecole* regional e-education system brings together 10 countries around a French-speaking project to share resources for 6.6 million pupils and their teachers.

Steered by UNESCO within the framework of the Global Coalition for Education, with funding from the Global Partnership for Education (GPE) and from France (Ministry of Europe and Foreign Affairs and Ministry of National Education, Youth and Sport), this system enables resources to be shared and teachers to be trained in new teaching practices. It relies on the expertise of Réseau-Canopé, Maskott and France Education International (FEI).

Partnership/Collaboration: The principle of this partnership is to enable developing countries to rapidly benefit from the digital expertise of countries like France.

Stakeholders of the partnership include Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, Niger, Senegal, Togo, UNESCO, the Global Partnership for Education (GPE), the Conference of Ministers of Education of the Governments and States of the Francophonie (CONFEMEN), the French Government (Ministry of Europe and Foreign Affairs and Ministry of National Education, Youth and Sports), and French educational and digital agencies Réseau-Canopé, Maskott and France Education International (FEI).

Digital technology: Essential. The programme is based on the creation of the digital platform *Imaginecole*. To support the programme, particularly through training teachers in digital uses, online courses have been given (145 sessions between April and October 2021) and 12 training modules in digital education have been created.

INDIA

Title: Multidisciplinary Education and Research Improvement in Technical Education (MERITE)

Beneficiary group/s: Students, teachers, institutions, girls/women, those of low socio-economic status, those in rural areas

Implementer: The program will be implemented and monitored through a dedicated Programme Implementation Unit (PIU) under the guidance of the Ministry of Education, the Government of India and the World Bank.

Short description: The scheme aims to modernize the technical education sector in the country through the reforms envisioned in the National Education Policy 2020. MERITE has three components: i) modernizing teaching, learning and assessments to enhance employability and strengthening equitable access; ii) conducting research for better skills and innovation; and iii) sectoral steering, including governance and internal and external quality assurance.

Partnership/Collaboration: MERITE will be implemented with the support of the World Bank for a duration of five years (2022–2027). The scheme envisions private sector engagement in curriculum reform, incorporation of future skills in content delivery, research collaboration on disruptive technologies, and partnerships for online education, adaptive learning, assessment and e-content, among others.

Digital technology: The MERITE project envisages use of open educational resources, learning management systems (LMS) such as Moodle, ILIAS and NEO, management information systems, enterprise resource planning (ERP) and other digital tools. The MERITE Project also intends to develop digital infrastructure (connectivity and devices) and capabilities for online/distance and blended teaching, learning and assessments. It also proposes to introduce digital governance through ERP with student tracking and employer feedback systems, as well as 360-degree feedback for faculty accountability and transparency in governance.

INDIA

Title: PM eVIDYA

Beneficiary group/s: Students, teachers, principals, parents/caregivers, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, people of migrant backgrounds

Implementer: Ministry of Education, National Council of Educational Research and Training (NCERT), Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG), States/Union Territories, Ministry of Information and Broadcasting (MoIB)

Short description: A comprehensive initiative called PM eVIDYA was initiated as part of Atma Nirbhar Bharat Abhiyaan (the self-reliant India campaign) on 17 May 2020, which unifies all efforts related to digital/online/on-air education. The objective is to enable multimodal access to education, through programmes including DIKSHA (Digital Infrastructure for Knowledge Sharing –One Nation One Digital Platform), SWAYAM Prabha (One Class One TV Channel), Learning through Radio/Community Radio/Podcasts, and digital learning content for children with special needs.

Partnership/Collaboration: Civil Society Organizations (CSOs) as necessary for technical support and outreach.

Digital technology: DIKSHA requires device access. To access video content and practice tests, internet connectivity is required; this content can also be downloaded for offline learning.

RUSSIAN FEDERATION

Title: The national project Education

Beneficiary group/s: Students, teachers, parents/caregivers, school staff, especially in rural areas

Implementer: Ministry of Education, with support from interested federal executive authorities and the constituent entities of the Russian Federation

Short description: The national project Education ensures the development of education infrastructure, the professional development of teaching staff and management personnel, and the improvement of education content. The project aims to provide opportunities for self-realization and talent development.

Partnership/Collaboration: Educational organizations implementing primary general, basic general, secondary general and secondary vocational education programmes are provided with online access to digital educational resources and services developed by Innopolis University.

Digital technology: Essential. The Ministry of Education of the Russian Federation continues to create conditions for the phased implementation by 2024 in educational organizations of all types and levels of contemporary and safe digital educational environments. The Ministry has put into trial operation the first stage of the federal state information system 'My School', which includes the subsystem 'Library of Digital Educational Content'.

SAUDI ARABIA

Title: Khebrat (Experience)

Beneficiary group/s: Educational practitioners in schools (teachers, school leaders, school representatives, educational supervisors)

Implementer: Ministry of Education; international universities hosting the programme in several countries (Australia, New Zealand, the United Kingdom and the United States)

Short description: The goal of the Khebrat programme is to build leaders for change in schools by providing participants with modern skills and knowledge through the Living in Advanced Global Environments programme. Participants are exposed to new teaching and learning methods through long-term experiences in international environments. The coexistence programme is designed to suit different educational categories, and each educational category has its own goals that seek to transfer the impact gained during the cohabitation period due to the COVID-19 pandemic. The number of those who completed the programme and passed its requirements was 495 male and female trainees. The programme has been completed. Partner universities have been contacted to grant them the professional development hours that have taken place up to the date of the programme's end.

Partnership/Collaboration: The Ministry of Education cooperated with various international universities hosting the programme in Australia, New Zealand, the United Kingdom and the United States.

Digital technology: Essential

UNITED ARAB EMIRATES

Title: Solidarity and partnerships

Beneficiary group/s: Students, teachers, principals, parents/caregivers, specifically girls/women, those of low socio-economic status, those in rural areas

Implementer: Ministry of Education, with local business entities, universities and international organizations such as College Board, Microsoft, McGraw-Hill and NGSS

Short description: The Ministry of Education has sought multilevel partnerships with countries in the region, local private entities and universities and international educational organizations to ensure the exchange of best practices and real-life experiences for students. The objective is to promote a holistic model of partnership between private and public institutions locally and internationally to boost the exchange of best practices and to support rapid recovery from the learning and knowledge gap caused by the COVID pandemic.

Partnership/Collaboration: Collaboration and partnership with national and international institutions, universities and the private sector in reviewing and updating the curricula to reflect best innovative practices. These national and international educational institutions include College Board, NGSS, Microsoft, Pearson, McGraw Hill, Al Ain university, Khalifa university, Zayed University and many other local and private organizations. The UAE has taken the lead in boosting regional peace and cooperation through the historic signing of the Abraham Accords with Israel, thereby strengthening stability and peace in the region and promoting values such as tolerance.

Digital technology: Somewhat important

3.

Delivering on Universal Quality Education

Universal quality education (UQE) is one of the key promises of SDG 4. Ensuring universal quality education is fundamental to closing the learning gaps created by inequalities and exacerbated by COVID-19 school disruptions, and to achieving SDG targets by 2030.

Despite the pandemic, G20 countries have continued to work towards advancing universal quality education through five key strategies: (1) accelerating learning recovery efforts, (2) giving every child a good start in life, (3) promoting inclusion by leaving no one behind, (4) promoting technical and vocational education and training (TVET) for economic adaptability and resilience and (5) leveraging digital technology.

This chapter will, first, analyse data on education from the UNESCO Institute of Statistics. Then, section 3.2 will explore the broader efforts of G20 Member States and partners to achieve universal quality education. Section 3.3 will examine policies and programmes that target Early Childhood Care and Education (ECCE), and section 3.4 will discuss efforts to strengthen inclusive education by prioritizing historically excluded groups. Section 3.5 deals with TVET, shedding light on the ways in which countries support the needs of individuals and economies. Finally, section 3.6 deconstructs the various focus areas of programmes and policies targeting digital technology. Digital technology is given particular attention in this

chapter, but it is also addressed in every other part of the report, due to its transversal nature in supporting the programming of G20 countries in the digital age.

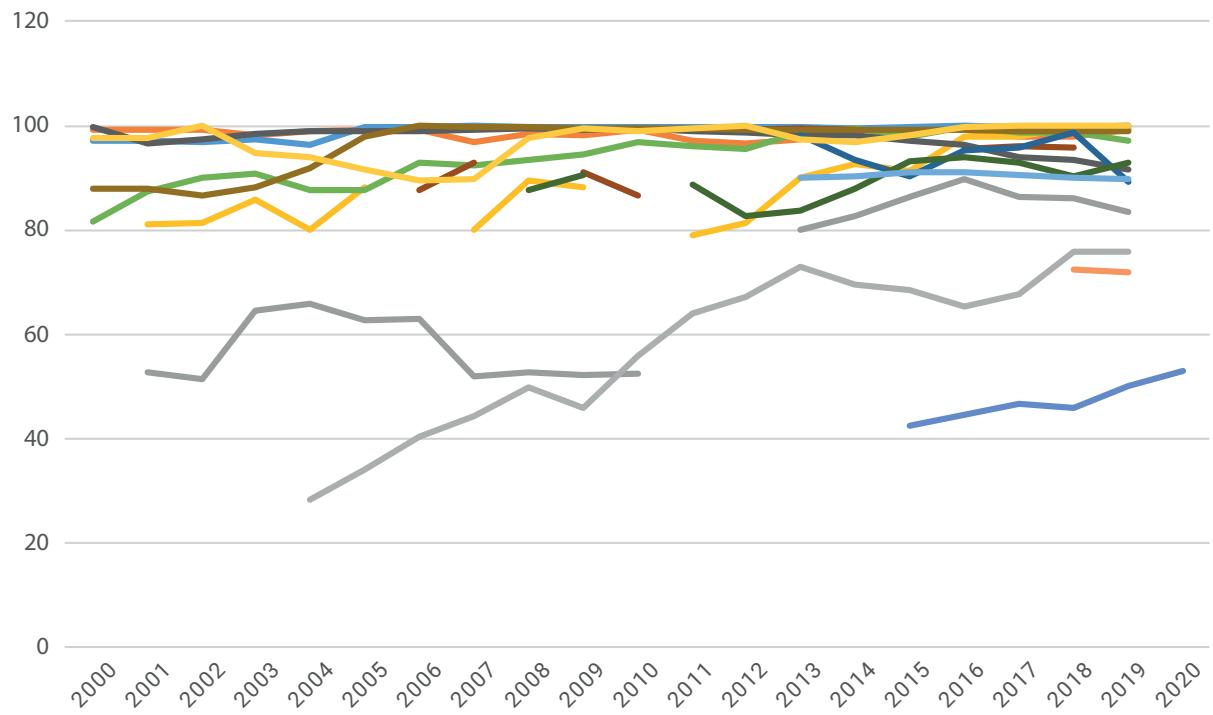
3.1. State of education development trends

This section presents a snapshot of the state of implementation of universal quality education among G20 countries through the lens of key indicators: participation rates in pre-primary education; learning outcomes at the end of primary; and completion rates in upper secondary. Internet connectivity penetration and access to devices are also indicators of education equity and quality, as evidenced by the level to which countries were ready and able to deliver remote learning during COVID-19 school closures.

Pre-primary education

It is now widely acknowledged that early childhood education is a powerful means to improve equity in learning and life. As shown in Figure 3, many G20 countries have had high rates of participation in pre-primary education for decades. Some countries started at a lower enrolment level, but significantly expanded coverage over time.

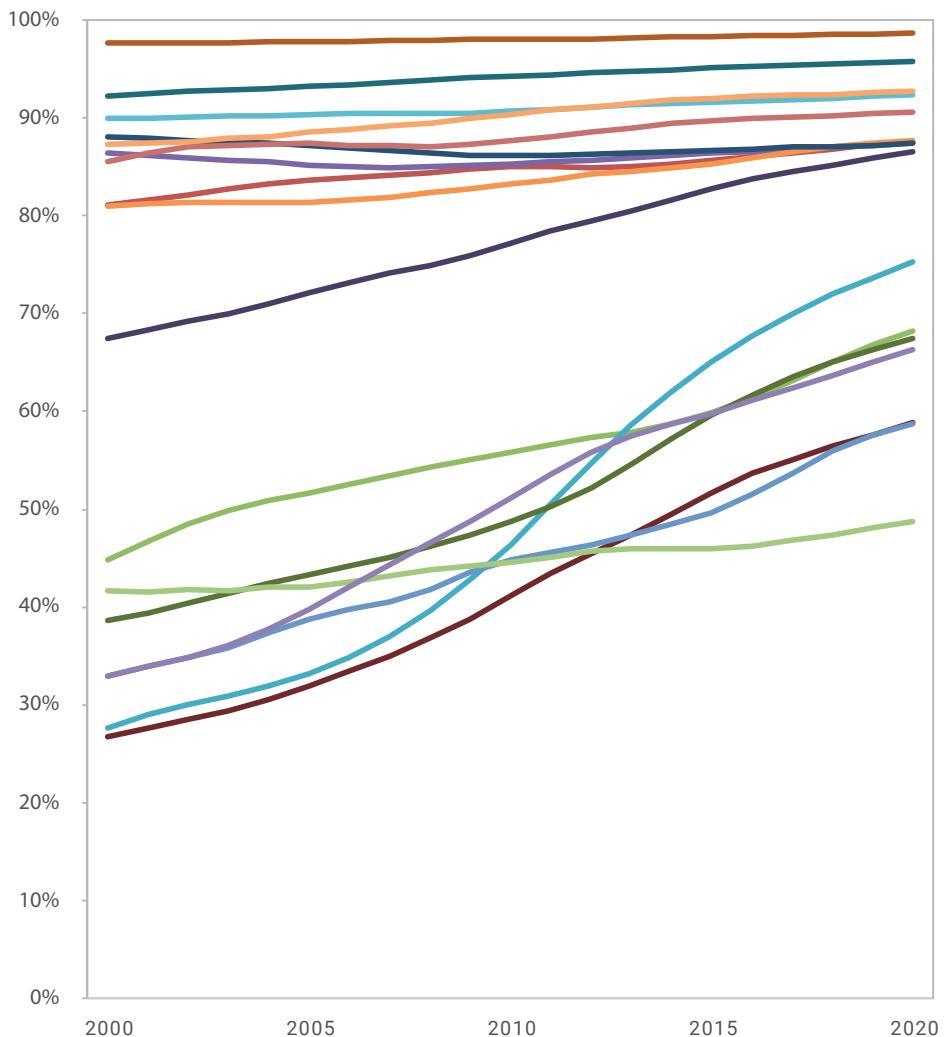
Figure 3: Adjusted net enrolment rate, one year before official primary entry age, both sexes (%)



Source: UIS.

School education completion and access to tertiary education

School education completion at upper secondary level varies across G20 countries (Figure 4). As with pre-primary education, there are two groups of countries: (1) high-income countries with established education systems and high completion rates; and (2) large middle-income countries where education systems are expanding. The differences between these two groups of countries have been narrowing over the last 20 years, and some countries' upper secondary completion rates have been improving very rapidly.

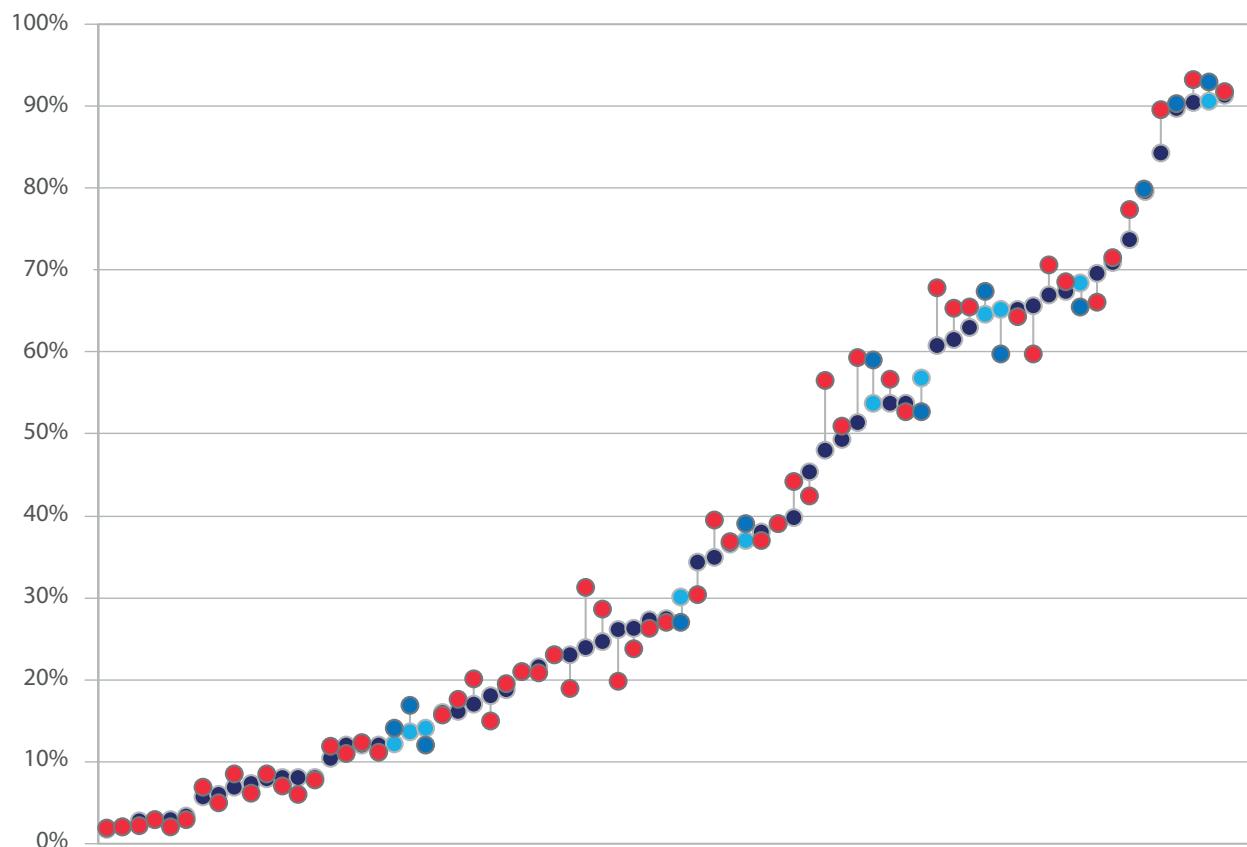
Figure 4: Upper secondary education completion rate, 2000–2020

Source: UIS.

Learning outcomes

Learning outcomes also vary significantly across G20 countries (Figure 5). Some countries show high levels of learning achievement, some show moderate levels of achievement (60 per cent–70 per cent) and some are struggling (less than 20 per cent). In some countries, gender disparity in learning outcomes is evident (Figure 5), with girls outperforming boys in some and boys outperforming girls in others.

Figure 5: Percentage of male and female students above minimum proficiency in maths, end of primary (G20 countries highlighted)

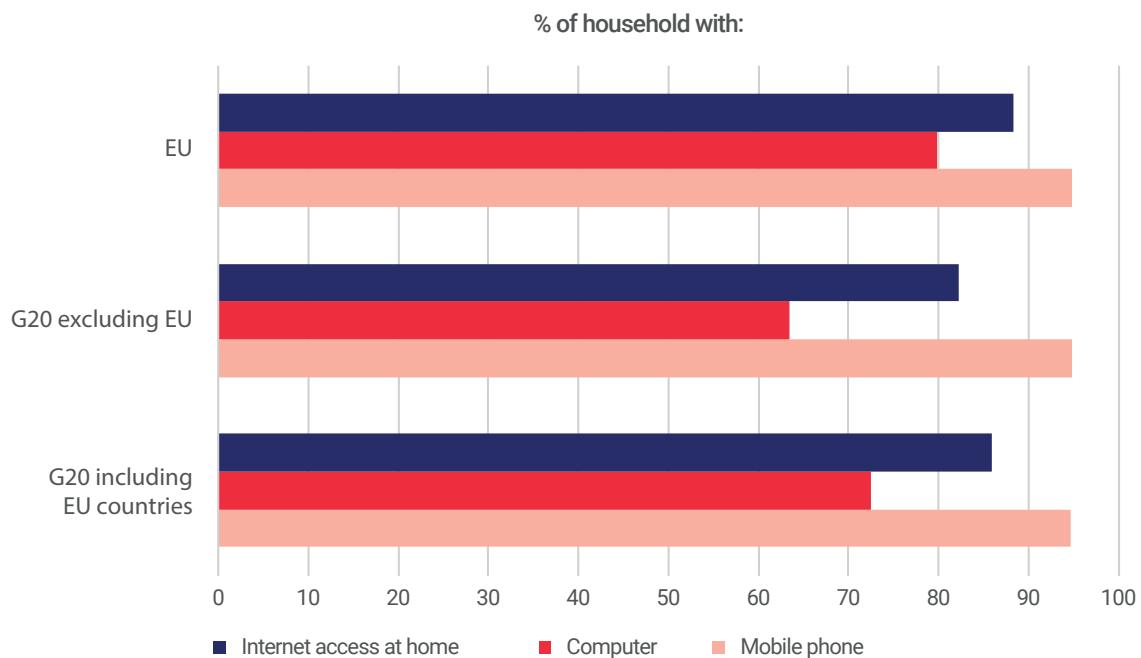


Source: UIS, 2019.

Connectivity

As discussed in Chapter 1, G20 countries worked hard to minimize the learning disruption caused by the COVID-19 pandemic. During school closures, most countries shifted to distance learning in order to ensure learning continuity. That meant that access to the internet and to internet-capable devices became one of the determining factors in whether or not distance learning was equitable. Most households in the G20 countries have access to mobile phones, but internet access and access to computers at home is in some cases limited (Figure 6). It will be critically important to address the delayed and lost learning among disadvantaged learners who had limited connectivity.

Figure 6: Percentage of households with access to the internet, computers and mobile phones, EU and G20



Source: Adapted from ITU Datahub, 2022.

3.2. Recovery within broader efforts to achieve universal quality education

National priorities in advancing universal quality education varied widely among G20 and invited countries. In their responses to the survey commissioned by the Indonesian Presidency of the Education Working Group, some countries reported specific priorities with concrete objectives and targets, while others described a general policy, framework or vision. For example, the Italian Recovery Plan aims to provide adequate basic skills to at least 1,000,000 students per year for four years and to improve infrastructure of 100,000 schools, while Spain and Brazil referred to ensuring the right to education for all and to promoting principles of non-discrimination (e.g., based on gender, ethnicity, language, disability, religion, etc.).

Some G20 countries prioritized efforts to recover from COVID-19 school disruptions, which have created the risk that the existing learning crisis will become a generational catastrophe, especially for marginalized and vulnerable groups, within the broader universal quality education agenda (UNICEF, 2022). These countries, for example **Brazil** and **South Africa**, are focusing on expanding access and completion in primary and lower secondary education, improving early reading and numeracy outcomes, and building key infrastructure. In some cases, new legislation

and/or policies were required to enable SDG 4 targets to be met. For example, in **Brazil**, the National Education Plan (2014–2024) established targets for achieving universal access to education and primary level completion rates. In **Cambodia**, improvement of completion rates in upper secondary is targeted through the Upper Secondary Education Sector Development Programme, funded by the Asian Development Bank (ADB). The programme aims to improve the quality of upper secondary teachers, increase the quality and relevance of upper secondary education for students entering the labour market, and strengthen institutional capacity for education planning, management and delivery.

More advanced economies are building on their historical progress by prioritizing or targeting specific issues, such as increasing financing, targeting underserved areas or excluded groups, improving governance mechanisms, and developing enabling frameworks for more effective partnerships and collaborations. These countries and economic regions have for the most part already achieved universal primary and secondary education that is free and accessible to all, as well as relatively high upper secondary completion rates and high literacy and numeracy rates in the adult population (e.g., **Australia**, **Canada**, **France**, **Germany**, the **United Kingdom** and the **European Union**).

For example, in **Canada**, the Council of Ministers of Education, Canada (CMEC) released the Ensuring Inclusive and Equitable Quality Education: Sustainable Development Goal 4 report in 2020 to provide a framework for information-sharing among provinces and territories and at the international level on work under way in Canada to achieve SDG 4. Also in 2020, the **European Union** released a strategic framework for the European Education Area initiative, aimed at strengthening policy cooperation among Member States and enhancing synergies with the Bologna Process and other European initiatives.

However, even among more advanced economies, learning recovery is recognized as an essential strategic priority. For example, England's (the **United Kingdom**) Levelling Up White Paper published in 2022 aims to level up every corner of the UK. This includes missions to improve educational outcomes across reading, writing and maths and increase the number of people successfully completing high-quality skills training. This builds on the Government's ambitious education recovery plan worth an overall £5 billion.

The **European Union's** Recovery and Resilience Facility, which provides specific and targeted funding (€750 billion) for education and training in EU Member States to support recovery from the effects of the pandemic, is also

contributing to the new European Education Area strategy, which launched in 2020. **France** has received about €40 billion from this funding to implement a National Recovery and Resilience Plan, of which €302 million will go towards education-specific measures that include pedagogical and digital continuity.

In Ontario (**Canada**), the Learning Recovery Action Plan to support students' recovery from the disruption of the COVID-19 pandemic will continue to run until the end of the 2022/23 school year. The plan seeks to strengthen reading and maths skills, stabilize and improve student mental health and well-being, and build a modern, safe and sustainable school system.

In **Germany**, the federal government and the state governments agreed to expand the DigitalPakt Schule initiative, begun in 2019, with three new programmes to address COVID-19 learning disruptions. To resource the programmes, the federal government is to provide additional funding of €1.5 billion. The Länder also agreed to pay their own share of at least 10 per cent and are responsible for implementing the programmes.

Table 5 provides details on programmes that target learning recovery across G20 Member States and invited countries.

Table 5. Programmes/initiatives targeting learning recovery

CANADA
Title: Learning Recovery Action Plan (Province of Ontario)
Beneficiary group/s: Students
Implementer: Ontario Ministry of Education, school boards
Short description: The Learning Recovery Action Plan will help students recover from the disruptions of the COVID-19 pandemic. The plan seeks to strengthen reading and maths skills, stabilize and improve student mental health and well-being, and build a modern, safe and sustainable school system.
Partnership/Collaboration: School boards have flexibility in partnering with community agencies or local companies on some components of the Learning Recovery Action Plan, as appropriate, in order to leverage external expertise and resources.
Digital technology: (Somewhat important) School boards can decide how to implement various components of the Learning Recovery Action Plan in order to best meet the needs of their students, which may include virtual or online delivery models.

FRANCE

Title: National Recovery and Resilience Plan (NRRP)

Beneficiary group/s: Students, school staff, those of low socio-economic status

Implementer: Ministry of National Education and Youth, in association with the European Commission

Short description: France has obtained funding of around €40 billion (around 40 per cent of the total cost of the plan) from the EU's Recovery and Resilience Facility for the country's NRRP, which forms part of the *France Relance* national plan. The NRRP assigns €302 million to education, which will be used to revitalize boarding schools of excellence (€50 million); support *cordées de la réussite* (a scheme offering support to students in school career planning and aiming to introduce greater social equity in access to higher education courses) (€10 million); enable new baccalaureate holders to continue their studies (€76 million); ensure pedagogical continuity (€131 million); and provide digital services to sustain administrative continuity (€32 million).

Partnership/Collaboration: The EU Recovery and Resilience Facility is a historic step towards greater solidarity and economic integration within the European Union. The historic NextGenerationEU recovery plan of €750 billion agreed at the July 2020 European Council is financed by a common debt issue, including the Recovery and Resilience Facility which supports Member States' recovery efforts, targeting in particular those who have been hardest hit by the crisis, and enabling massive investment in the green and digital transition.

Digital technology: Essential. Two measures target the digital modernization of the education system: the first aims to facilitate administrative follow-up and management of primary and secondary schools; and the second aims to ensure that all schools are equipped with a minimum common digital base (hardware, software and access to educational resources), so that no pupil is left behind in the digital transition.

INDONESIA

Title: Transformation of Teachers and Education Personnel

Beneficiary group/s: Students, teachers, principals, school staff, exceptional children

Implementer: Ministry of Education, Culture, Research and Technology

Short description: The Ministry of Education, Culture, Research and Technology seeks to improve the competence of teachers and education personnel through several programmes: the Pioneer Schools programme, the Pioneer Communities programme and the Pioneer Teachers programme. The Pioneer Schools programme focuses on developing student learning outcomes holistically, including literacy and numeracy as well as socio-emotional competencies. The Pioneer Communities programme has a similar goal, to improve student learning outcomes by assisting educators and education staff in acquiring the necessary competencies. The Pioneer Teachers programme is a professional development programme that focuses on developing learning leadership and teacher independence. This programme is aimed at teachers who have the potential to become future leaders.

Partnership/Collaboration: The Pioneer Schools programme is a collaboration between the Ministry of Education, Culture, Research and Technology and local government. Each stage, from school selection to financing, is carried out by both parties - the central and local government. Participating organizations such as partner universities, social institutions, village heads, leaders, etc., may be eligible for government assistance in transforming schools into Pioneer Schools through training programmes, capacity-building and competency development for educators and education personnel.

Digital technology: Essential. School Digitalization is one of the interventions carried out, so the role of digital technology is very important in programme implementation. The use of various digital platforms aims to reduce complexity, increase efficiency, add inspiration and provide a customized approach. The goal is to aid in the implementation of educational policies that will be implemented at Pioneer Schools in the learning process, teacher competency development, and school resource management. The process of registering and selecting organizations to become Pioneer Communities is also done online. Meanwhile, the Pioneer Teachers education programme is being carried out using the Professional & Sustainable Development Management Information System (SIM-PKB) developed by the Directorate-General of Teachers and Education Personnel (GTK) of the Ministry of Education, Culture, Research and Technology. A SIM-PKB account is required for every Pioneer Teacher.

ITALY

Title: Educational and Organizational Digitalization of Schools: from the National Digital School Plan to the National Plan for Recovery and Resilience

Beneficiary group/s: Students, teachers, school staff, all schools

Implementer: Ministry of Education, with one activity conducted in collaboration with the Ministry of Economic Development

Short description: The programme involves short- and long-term actions, based on the specificities of the different types and grades of schools, which will transform school spaces from traditional classrooms into innovative learning environments, both physical and virtual, connected to the internet and integrated with digital technologies.

Partnership/Collaboration: n/a

Digital technology: Essential. The investment makes available the most innovative digital technologies for teaching (coding and devices for robotics, for virtual reality, for inclusive education, etc.) to be used in teaching at least 100,000 primary and secondary school classes.

ITALY

Title: Extraordinary Intervention Aimed at Reducing Territorial Gaps in Lower and Upper Secondary Schools

Beneficiary group/s: Students, teachers, principals, school staff, those of low socio-economic status, those in rural areas, those from migrant backgrounds, most fragile schools and territories

Implementer: Ministry of Education

Short description: This priority programme involves the implementation of a plan that, on the basis of an analysis of school trends showing gaps within the country, aims to provide adequate basic skills to at least 1,000,000 students per year for four years, including through the development of a national platform for online training. It has several related objectives: a) valorization of key competences and reduction of territorial gaps; b) prevention of early school-leaving and the promotion of educational success, including through the use of online tools; and c) promotion of social inclusion and integrated digital education for people with sensory and/or intellectual disabilities or from disadvantaged areas.

The programme will provide targeted support for schools that have encountered greater performance difficulties, mentoring and training actions (including distance learning) for at least 50 per cent of teachers, and the extension of school time for at least 2,000 schools.

The programme is part of the National Plan for Resilience and Recovery and intersects with the integrated in-presence and digital education investment and the School 4.0 investment.

Partnership/Collaboration: n/a

Digital technology: Essential. The programme provides for the creation of a digital platform for online mentoring and training of students, as a support measure for the programme's actions. The platform will be a channel for simple, direct and personalized interaction between mentor and student, conveying teaching and orientation content, encouraging communication and continuous monitoring of learning and teaching processes, sharing agendas, time and objectives, and offering regular motivational responses and reinforcement to the student throughout the course of the activities.

MEXICO

Title: National Strategy to strengthen diagnostic evaluation, improve educational achievement and reduce school lag and dropout rates

Beneficiary group/s: Students, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds

Implementer: Secretariat of Public Education/ Undersecretariat of Basic Education

Short description: The strategy aims to address and mitigate the academic damage caused by the pandemic, and to guarantee students' ability to exercise their right to education regardless of their origin or status. The proposal seeks to lay the foundations for a recovery that will allow for long-term improvements, with a strategic vision that sees education as an essential lever to achieve development with equity and justice.

Partnership/Collaboration: Along with the Secretariat of Public Education/ Undersecretariat of Basic Education, other institutions involved in the programme include the Inter-American Development Bank (IDB), the Organization of Ibero-American States for Education, Science and Culture (OEI), UNESCO, UNICEF, SUMMA (Laboratory for Research and Innovation in Education for Latin America and the Caribbean) and the World Bank.

Digital technology: Somewhat important. A microsite will provide a bank of good practices and a webinar will take place on good practices in learning recovery and student retention. In addition, an Early Warning System is planned. Plans are in place to implement a pilot exercise of the Diagnosis and Protocol of Socioemotional Attention, to activate the course on the platform of the General Directorate of Continuing Education for Teachers and Managers and on Mexico X, and to design toolboxes on various topics online.

THE NETHERLANDS

Title: National Programme on Education

Beneficiary group/s: Students, teachers, principals, school staff

Implementer: Ministry of Education, Culture and Science

Short description: The National Programme on Education aims to help all learners to recoup learning loss during the pandemic and has provided schools with an additional €8.5 billion in funding. Schools are asked to assess learning loss and loss of well-being and can then use the funding granted to implement scientifically proven interventions to support the learner.

Partnership/Collaboration: The National Programme provides education institutions with funding and a 'menu' of scientifically proven interventions from which schools can choose.

Digital technology: Somewhat important. The resources of the National Programme may be used by schools to provide digital tools and other resources that children need in order to participate in digital education.

REPUBLIC OF KOREA**Title:** Comprehensive Plan for Educational Recovery**Beneficiary group/s:** Students**Implementer:** Ministry of Education, provincial offices of education, elementary and secondary schools

Short description: The Comprehensive Plan for Educational Recovery is aimed at swiftly addressing educational loss caused by COVID-19 among elementary and secondary school students. From the second half of 2021 to 2022, the programme will provide comprehensive support to address learning loss, stabilize psychological well-being, foster social skills and improve physical health.

Partnership/Collaboration: n/a

Digital technology: Somewhat important. The programme will make use of digital edutech technologies such as real-time imaging systems and LMS in conducting non-face-to-face classes and educational activities, depending on circumstances.

UNITED KINGDOM (ENGLAND)**Title:** Education Recovery**Beneficiary group/s:** Students, teachers, principals**Implementer:** Department for Education

Short description: The programme makes a commitment of nearly £5 billion to fund a comprehensive and evidence-based recovery package, providing support to all pupils while prioritizing the most disadvantaged, the vulnerable and those with the least amount of time left in education.

Partnership/Collaboration: n/a

Digital technology: Essential. Examples include the National Tutoring Programme (NTP), which has well-developed arrangements for remote learning when required. Digital technology plays a significant role in the wider recovery support for schools, the Oak National Academy Summer Teacher Hub and Summer Classroom, which provides free resources and lessons for both face-to-face summer schools and summer home learning; a mental well-being training module to improve subject leads' and teachers' expertise and confidence; and a list of resources to help early years settings, schools and education providers to access support for the well-being and education recovery of children and young people.

3.3. Developing education systems that give every child a good start

Countries agree that quality early learning (from birth to 8 years) is essential for successful education, economic and life outcomes. For the most part, G20 and invited countries reported that policies and programmes on universal quality education covered all education levels (pre-primary, primary, lower and upper secondary, and tertiary); the **European Union's** European Education Area strategy, for example, sets out a long-term vision for strengthening the resilience of the EU's education and training systems, covering all levels of education (International Standard Classification of Education 0–8). Some countries, however, specifically focused on enhancing early learning as a key priority. In some countries, early learning programmes are integrated into wider initiatives covering family services, childcare, health and nutrition. Others targeted early years specifically (see Table 6).

In **Australia**, for example, under the Preschool Reform Agreement 2022–2025, the federal government and the states and territories are together developing and implementing a reform agenda to increase preschool enrolment and attendance. The government will provide a funding contribution to support the delivery of preschool for 15 hours per week to children in the year before full-time school.

Meanwhile, England (the **United Kingdom**) has expanded its Education Recovery package of support by offering additional funding for schools to catch up on missed learning opportunities from pre-primary to post-secondary level (ISCED 0–4), which includes new funding for state-funded schools to scale up access to proven approaches such as the Nuffield Early Language Intervention. Early years education is also specifically targeted in the ‘Families’ priority.

Türkiye identified the early years as one of three national priorities for achieving universal quality education (with the other two being teachers’ continuous professional development and the development of a quality TVET system). The early learning policy targets children at pre-primary level, with a specific focus on low-income groups. The programme aims to increase the quality of and access to early childhood services by expanding access, especially for the most disadvantaged children, through updated legislation.

In the **UAE**, new vocational qualifications are being written for Nursery Managers, Nannies, Assistants and Educators, formalizing, for the first time, a unified UAE-specific

framework for early years practitioners in the nursery workforce.

Making childcare more affordable can help to make it more accessible. **Canada** aims to decrease the cost of regulated childcare to CAD 10/day on average by 2025–2026. By the end of 2022, the Government is aiming to reduce average fees for regulated childcare spaces by 50 per cent to make them more affordable for low- and middle-income families across Canada. This will help support women to fully and equally participate in the labour force, education and public life. **Japan**, meanwhile, has made education free at kindergartens and centres for early childhood education and care for children aged 3 to 5. **India** aims to support quality early childhood care and education under its Samagra Shiksha Programme by making provision for Balvatikas or pre-schools. National Education Policy 2020 lays ground for further initiatives including strengthening ECCE facilities, Anganwadis Centres, and ensures that every child will attend a preparatory class or Balvatika before the age of 5. In addition, NCERT is developing a play-based learning package with a focus on developing cognitive, affective and psychomotor abilities and early literacy and numeracy.

Most importantly, the National Education Policy (NEP) overhauls the current 10+2 model of school education system to introduce 5+3+3+4 format. By implication, it brings the uncovered age of 3–6 years under the school curriculum. India has already launched the National Mission on Foundational Literacy and Numeracy called the “National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat)”, for ensuring that every child in the country necessarily attains foundational literacy and numeracy by the end of Grade 3.

In **Türkiye**, an important objective of the early learning policy is to work towards changing parental attitudes about the importance and value of early childhood learning, targeting economically disadvantaged families who have historically been excluded. **Brazil**'s Education and Family initiative aims to foster parents' participation in their students' school life by engaging families to reflect on their children's life aspirations and consider ways they can plan actions to build towards achieving that future.

In **Mexico**, the National Early Education Policy aims to improve quality of and access to comprehensive early childhood care services beginning from when children are 43 days old, targeting boys and girls in vulnerable situations and at risk of exclusion. The programme also includes a component on enriching child-rearing practices and promoting strong emotional bonds in families. And **South Africa**'s Early Childhood Development programme

proposes a comprehensive approach to the education of children from birth to 9 years of age, enlisting the active participation of parents and caregivers in protecting the child's rights to develop his or her full cognitive, emotional, social and physical potential.

Table 6. Programmes/initiatives targeting early learning specifically (ISCED 0–1)

AUSTRALIA

Title: Universal Access National Partnership Agreement (UANP) 2018–2021 and Preschool Reform Agreement (PRA) 2022–2025.

Beneficiary group/s: Students

Implementer: The Australian Government and the States and Territories

Short description: Under the PRA, the Australian Government and States and Territories will together develop and implement a reform agenda to lift preschool enrolments and attendance and maximize the benefits of preschool.

Partnership/Collaboration: The Australian Government and the States and Territories share responsibility for implementation of the PRA: States and Territories are responsible for the delivery of preschool in their jurisdictions, and the Australian Government provides a funding contribution to support 15 hours per week of preschool for children in the year before full-time school.

Digital technology: Reforms aimed at improving preschool participation and maximizing the benefits of the preschool year require the development of new attendance and outcomes measures, which may necessitate building systems to collect, analyse and report data. As work progresses, the use of digital technologies to deliver reforms could be considered, but it is too early to identify the specific role technology could play.

BRAZIL

Title: Laboratory of Creativity and Innovation for Basic Education (LABCRIE)

Beneficiary group/s: Teachers and principals

Implementer: Federal University of Mato Grosso do Sul, State Departments of Education and Department of Education of the Federal District

Short description: To meet the goals of the National Plan for Education, LABCRIE will foster innovation and educational technology through creating dynamic spaces with cutting edge resources in order to help teachers and managers learn to use technologies to implement pedagogies that meet the demands of the current educational context. Teacher development will be supported through knowledge sharing, collective construction, experimentation and activity planning, material sharing, self-assessment and peer assessment.

Partnership/Collaboration: The programme collaborates with Federal Universities to share resources.

Digital technology: Essential. The programme will teach and embody digital culture and digital skills for professional engagement and practice; active methodologies; and maker culture, computational thinking and robotics.

CANADA

Title: Early Learning and Child Care (ELCC)

Beneficiary group/s: Students, teachers, principals, parents/caregivers, Indigenous people, youth and children

Implementer: Government of Canada

Short description: The Government of Canada has made a transformative investment to build a Canada-wide ELCC system in partnership with provincial, territorial and Indigenous partners to ensure all families have access to high-quality, affordable, flexible and inclusive ELCC. The goal is to bring fees for regulated childcare down to CAD 10 per day on average by 2025–2026. By the end of 2022, the Government aims to reduce average fees for regulated ELCC spaces by 50 per cent. These targets will apply everywhere outside of the province of Quebec, which already has an affordable, well-established system.

Partnership/Collaboration: The Government of Canada is working with provincial and territorial colleagues and Indigenous partners to sign new ELCC agreements to support a Canada-wide system.

Digital technology: n/a

FRANCE

Title: Pre-primary and primary class size reduction in priority education areas

Beneficiary group/s: Students, those of low socio-economic status

Implementer: Directorate-General for Schools, Ministry of National Education and Youth (*Direction générale de l'enseignement scolaire – DGESCO – Ministère de l'Education nationale, de la Jeunesse et des Sports*)

Short description: French education ministry studies show that by the end of elementary school, 20 per cent of pupils have not mastered basic skills. To meet this challenge, the French Ministry has halved pre-primary, 1st and 2nd grade class sizes (5-, 6- and 7-year-olds) in priority education areas (20 per cent of schools in France), allowing teachers to provide better support for children, especially those with the greatest difficulties, and so contribute to reducing educational inequalities in disadvantaged areas. As of September 2021, 330,000 pupils had benefited from the measure. A maximum of 24 pupils per class in pre-primary and 1st grade was set in the remaining 80 per cent of schools in France. Improved scores in French and Mathematics on national assessments in 2018 and 2019 show the positive effects of this measure.

Partnership/Collaboration: n/a

Digital technology: Somewhat important. The main role of digital technology is in teacher training, especially for newly recruited teachers.

ITALY

Title: Plan for an Integrated Early Childhood Education and Care System

Beneficiary group/s: Students, teachers, parents/caregivers, school staff, girls/women, those of low socio-economic status, most fragile schools, territories and regions

Implementer: Ministry of Education

Short description: This priority programme is aimed at increasing the educational offering of the integrated system of Early Childhood Education and Care from birth to 6 years, using the national budget and the Recovery and Resilience Facility, in order to expand access to educational services in every region, with a special effort in Southern Italy, and to progressively reach universal access to pre-primary education. The programme also supports parents and aims to increase women's participation in the workforce, especially in areas of the country where educational services are most lacking.

Partnership/Collaboration: The programme provides for multilevel governance that involves the State, the Regions and local authorities, each with specific competences. The Ministry of Education guides, coordinates and promotes the integrated system, while the Regions partner in planning and monitoring and take responsibility for regulating and defining quality standards at local level. Local authorities (municipalities) also play a part in planning and management, as well as in the monitoring and supervision of educational services for children aged 0 to 3, and provide territorial pedagogical coordination, in cooperation with the Regions and the Regional School Office.

Digital technology: Somewhat important. To coordinate and exchange data at all levels, the programme provides for the activation of a national information system of children's educational services, which educational services authorized by local authorities must join. The National Register of the Integrated System of Education and Care 0–6 years is made up of the National Information System of Children Educational Services, the National Register of Students, and the Registry of State and Accredited Kindergartens, which are subject to the compulsory survey provided for by the National Statistical Plan.

JAPAN

Title: Making Early Childhood Education Free

Beneficiary group/s: Students

Implementer: Cabinet Office, Ministry of Health, Labour and Welfare, Ministry of Education, Culture, Sports, Science and Technology

Short description: Given the importance of early childhood education in reducing the burden of education in early childhood and cultivating the foundation for lifelong personality development, Japan has made education free at kindergartens and centres for early childhood education and care for children aged 3 to 5.

Partnership/Collaboration: n/a

Digital technology: Somewhat unimportant. ICT tools may be used to reduce the administrative burden on facilities.

MEXICO

Title: Política Nacional de Educación Inicial (National Early Education Policy, PNEI)

Beneficiary group/s: Students, teachers, principals, parents/caregivers

Implementer: Secretariat of Public Education/ Undersecretariat of Basic Education

Short description: PNEI aims to generate conditions for the provision of quality services to promote the integral development of children aged 0 to 3 as part of comprehensive early childhood care.

The plan will expand coverage of early education services, giving priority to girls and boys in vulnerable conditions and at risk of exclusion; improve the quality of the services offered in school-based and non-school-based early education; and promote the development of enriched child-rearing practices and strong emotional bonds in families.

Partnership/Collaboration: n/a

Digital technology: Somewhat important. ICT tools are planned through teacher training on the use of some applications that can help child development.

RWANDA

Title: Increased access to education programmes, especially at pre-primary level

Beneficiary group/s: Students, parents/caregivers, especially those in rural areas

Implementer: Ministry of Education Rwanda Education Board

Short description: The programme aims to ensure all children enter pre-primary schools/readiness centres at the right age and support them through all cycles of education. As part of the plan, all children will complete school readiness programmes; numbers of pre-primary centres and of pre-primary schools with qualified and salaried staff will be increased; and community and parental education programmes for early learning will be provided.

Partnership/Collaboration: UNICEF is a collaborating partner.

Digital technology: Essential. Digital technology is very important at pre-primary level, especially in the delivery of play-based learning, which helps foster a spirit of innovation and creativity in learners. Digital technology use should start at an early age. More initiatives (on top of one laptop per child) are needed.

SAUDI ARABIA

Title: Rawdaty (My Kindergarten) Digital Platform

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff

Implementer: Ministry Agency for General Education

Short description: The platform aims to provide high-quality synchronous and asynchronous interactive education for children at kindergarten, along with a variety of services for parents and practitioners, including digital content, an enrichment bank, attendance and absence tracking, events and announcements, reports and statistics, professional development programmes for kindergarten teachers, and others.

Partnership/Collaboration: The programme is a partnership between the Ministry Agency for General Education; the General Department of Early Childhood; the General Department of e-Learning and Distance Education; Tamkeen; the General Department of Digital Transformation; and Tatweer Company for Educational Services.

Digital technology: Essential. The platform uses digital technology to provide synchronous and asynchronous interactive education for children and a variety of services for parents and practitioners.

SINGAPORE

Title: Early Intervention (EI) programmes for children under the age of 7

Beneficiary group/s: Students, especially those with developmental needs

Implementer: Early Childhood Development Agency

Short description: The Early Childhood Development Agency (ECDA) serves as the regulatory and developmental agency for the early childhood sector in Singapore, overseeing key aspects of the development of children under the age of 7, across both kindergartens and childcare centres. Children under 7 who have developmental needs can receive intervention through Government-funded EI programmes, depending on the level of support needed, at an EI centre or their preschool.

Partnership/Collaboration: ECDA works with EI centres, preschools, social service agencies and clinics/hospitals.

Digital technology: Somewhat important. ECDA has developed an integrated case management system, the Social Service Net-Enabling Services (SSNet-ES), which facilitates monitoring and tracking of cases across agencies through different stages; supports one-stop case management with up-to-date information from related social programmes; and provides timely and accurate reporting. EI providers have also adapted ICT tools as an additional channel to support delivery of EI services throughout the pandemic, such as using video conferencing tools to support children remotely. They hold online webinars for parents to learn strategies to support their child's learning and developmental needs.

SOUTH AFRICA

Title: Improving learning outcomes: Early Childhood Development

Beneficiary group/s: Students, teachers, parents/caregivers, all learners in the country

Implementer: Department of Basic Education (DBE) / Ministry of Basic Education

Short description: In 2022, responsibility for early childhood development (ECD) centres has migrated from the Department of Social Development to the Department of Basic Education, and the process towards ensuring two years of compulsory ECD for all children before they enter grade 1 will be continued. This will allow the DBE to take responsibility for the education of learners from birth to Grade 12.

A comprehensive strategy is being implemented to ensure children can read for meaning by age 10. The strategy includes the provision of learning and teaching support material to all learners in Grades R–9 to improve literacy and numeracy.

Partnership/Collaboration: n/a

Digital technology: Essential. Digital technologies are used to offer standardized learning via television, radio, internet-based platforms and video lessons. A programme to provide devices is ongoing.

SPAIN

Title: Programme to promote schooling in the first cycle of early childhood education with new publicly-owned places (priority for 1 and 2 year olds): refurbishment/rehabilitation and equipment for new units; new construction and equipment; and operating costs.

Beneficiary group/s: Students, teachers

Implementer: The Education Administrations of the Autonomous Communities, local corporations through the Autonomous Communities, and the Ministry of Education and Vocational Training through the cities of Ceuta and Melilla

Short description: The four-year programme will provide accessible, affordable, inclusive and high-quality places in the first cycle of Early Childhood Education with new publicly-owned places in the first cycle of Early Childhood Education (with priority given to 1- and 2-year-olds), with the aim of advancing equal opportunities from the earliest ages. The programme will involve constructing and rehabilitating school infrastructure, both for centres owned by the regional and local administrations and by the Ministry (MEFP) through the cities of Ceuta and Melilla, as well as paying for running costs including educator salaries. When the programme cycle is complete, the educational administrations will assume, through their ordinary budgets, the maintenance of the places created.

Partnership/Collaboration: The programme will be developed through cooperation with the Education Administrations of the Autonomous Communities, within the framework of the Sectorial Conference on Education which, after the Council of Ministers' approval, will approve the requirements and criteria for the territorial distribution of funds and monitoring of implementation. The MEFP will execute the investment through the Cities of Ceuta and Melilla. After that, technical cooperation on the programme will be developed and mechanisms for monitoring and verifying its implementation will be instated.

Digital technology: Somewhat important.

TÜRKİYE

Title: Increasing Quality of and Access to Early Childhood Education Services (ECE) Project

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff, those of low-socio economic status.

Implementer: Ministry of National Education

Short description: The project aims to increase the quality of and access to early childhood education (ECE) services, especially for disadvantaged children. Under the programme, ECE services will be expanded and their quality improved. A learning environment that supports increased access to quality ECE services will be promoted through updated ECE legislation.

Partnership/Collaboration: UNICEF is providing technical support to the Ministry of National Education, and the Ministry of Labour and Social Security is the contracting authority.

Digital technology: Not important. There is no component in the project involving use of digital technologies.

3.4. Designing education systems that leave no-one behind

Many countries mention policies and programming that prioritize historically excluded groups, such as girls/women, students from low socio-economic backgrounds, migrants and rural/remote populations.

In some countries, such as **Mexico**, government policies and programmes cover all marginalized and vulnerable groups without distinction. Mexico has undertaken a broad initiative to reform the national basic education curriculum to incorporate cultural, social, linguistic, territorial, social and gender diversity. As part of its national strategy to strengthen diagnostic evaluation, improve educational achievement and reduce school repetition and dropout rates, it is developing a social-emotional care protocol for students in basic education, as well as promoting innovative methodologies, such as tutorials, teaching at the appropriate level, universal design for learning and project-based learning, to support learning recovery.

Japan's government-funded High School Tuition Support Fund covers tuition fees, while the High School Supplemental Scholarship programme covers school supply expenses other than tuition fees to promote equal opportunities in education. In the latter system, the government supports one-third of the budget of projects carried out by prefectures. Beneficiaries are certified every year but households that have experienced rapid and drastic changes in their budgets are treated flexibly.

Saudi Arabia's Human Capability Development Program aims to develop schools in remote areas in order to improve access to education in remote areas through a review of the school network and the introduction of distance learning tools to ensure access to high-quality education for all students.

Spain targets learners who experience difficulties in the formal education system, providing students and their families with educational and psycho-pedagogical services in schools and districts. The aim is to accompany students on their educational trajectory, designing personalized formative pathways that promote the enrichment of unachieved learning in collaboration with

guidance services, as well as strengthening links between families and educational centres and collaborating with other community resources to reduce absenteeism and early school-leaving.

In other countries, programmes target particular groups. In **Australia**, a Review of the Disability Standards for Education (conducted in 2020) showed that students with disabilities needed to be better informed of their rights and empowered to exercise them. Schools and other education providers needed help to better understand and meet their obligations, and accountability for meeting the Standards needed to be better embedded. These recommendations will be implemented under Australia's Disability Strategy 2021–2030.

In **India**, the Samagra Shiksha scheme aims to bridge social and gender equity gaps through the inclusion of disadvantaged groups across all levels of school education from pre-primary to grade 12. The programme targets girls aged 10 to 18 who belong to traditionally excluded social groups, including Scheduled Castes (SC), Scheduled Tribes (ST), and other marginalized communities. To encourage girls' participation in education, the existing Kasturba Gandhi Balika Vidyalayas (KGBVs, residential girls' schools) at upper primary level and Girls Hostels at secondary level have been extended or merged to provide residential and schooling facilities up to grade 12. The scheme also gives special preference to students from Educationally Backward Blocks (EBBs), LWE-affected districts, Special Focus Districts (SFDs), Border areas and the 117 aspirational districts identified by Niti Aayog.

Italy's Extraordinary Intervention Aimed at Reducing Territorial Gaps in Lower and Upper Secondary Schools targets students and schools of low socio-economic status, those in rural areas, those from migrant backgrounds, and the most fragile schools and territories.

In England (the **United Kingdom**), the programmes which sit under the priority of 'Families' prioritize children in state care with specific identified delivery outcomes that include improving adoption numbers by improving the effectiveness and timeliness of the adoption system, improving placement quality and stability by developing and consulting on national standards for unregulated children's social care provision, securing positive outcomes for care leavers, and providing advocates within the education system to improve the school attendance and participation of children in care. The programmes which fall under this priority focus on low-income families, with policies and programmes providing targeted support for families with seriously ill children, children who qualify for free school meals and children with special education needs.

Since learning disruptions during the COVID-19 pandemic exacerbated inequalities, some G20 countries have specifically focused on marginalized or vulnerable groups in their efforts to combat learning loss (see Table 7). For example, **Türkiye's** Digital Special Education Project aims to improve the quality of online learning environments for children with disabilities who missed out on learning because of COVID-19 school closures. The project also aims to provide counselling and guidance services for parents of children with special education needs who are learning remotely. Meanwhile, **Canada** is focusing on financial assistance for marginalized, vulnerable and under-represented groups, such as Indigenous students, through the Canada Student Financial Assistance Programme and the Canada Education Savings Programme. In **Ontario** (Canada), the Skills Development Fund, supported by labour-market transfer agreements between the Government of Canada and the Government of Ontario, targets historically under-represented groups and those disproportionately impacted by COVID-19, such as women, youth, persons with disabilities, Indigenous peoples, racialized groups and immigrants.

Table 7. Programmes/initiatives targeting vulnerable, marginalized or historically excluded groups in education (ISCED 0–8)

AUSTRALIA

Title: Implementation of the recommendations of the 2020 Review of the Disability Standards for Education

Beneficiary group/s: Students, teachers, principals

Implementer: The Australian Department of Education

Short description: Under the Disability Standards for Education, students with disabilities have the right to access and participate in education on the same basis as their peers. The Department of Education reviewed the Standards in 2020 and is working with disability and education peak bodies and with education authorities to develop information products which will support students, families and educators to understand and deliver those rights and obligations and embed accountability mechanisms. Implementing the Review recommendations will contribute to achieving the education goals of Australia's Disability Strategy 2021–31.

Partnership/Collaboration: Implementation work is progressing in close consultation with disability and education bodies and with education stakeholders, including non-government education providers.

Digital technology: Not important.

CANADA

Title: Canada Student Financial Assistance (CSFA) Program

Beneficiary group/s: Eligible students enrolled in post-secondary education programmes, including supports specifically targeted to students from low- and middle-income families, students with dependents and students with permanent disabilities

Implementer: Employment and Social Development Canada

Short description: The programme helps Canadians to access quality education by providing targeted grants and needs-based loans to eligible students enrolled in post-secondary education programmes to help cover the cost of tuition, books, mandatory fees, living costs and transportation. The programme offers supports specifically targeted to groups such as full-time and part-time students, students from low- and middle-income families, students with dependents and students with permanent disabilities. The CSFA Program also offers a Repayment Assistance Plan (RAP) to borrowers who face financial difficulty in repaying their Canada Student Loan (CSL). Students with permanent disabilities borrow through a uniquely designed repayment plan called the Repayment Assistance Plan for Borrowers with a Permanent Disability (RAP-PD). Students with permanent disabilities and students with dependents receive additional grants, and students with permanent disabilities can access grants for services and equipment.

Partnership/Collaboration: The programme is delivered in collaboration with the provinces and territories.

Digital technology: Essential. The primary access point for this service is the National Student Loan Service Centre (NSLSC) web portal, which is managed by a private third-party service provider. Through the NSLSC website and secure portal, student borrowers are able to access information and tools to support them through the student loan life cycle, including the ability to perform a wide range of account management activities electronically.

GERMANY

Title: School makes you strong (Schule macht stark)

Beneficiary group/s: Students, teachers, principals, parents/caregivers, those of low socio-economic status

Implementer: The Ministries responsible for Education in the 16 Länder and Federal Ministry of Education and Research in collaboration with 13 research institutes and universities as well as 200 schools

Short description: Schule macht stark is a joint initiative of the federal government and the Länder that supports schools in socially difficult locations in rural and urban areas and improves learning opportunities for socially disadvantaged students. The initiative is aimed at all types of schools and grades in primary and lower secondary education. The initiative is divided into two phases. In the first phase (2021–2025) scientists from 13 research institutes and universities are working closely with teachers and principals from 200 schools to identify opportunities for school and classroom development, to assess existing potential as well as to develop and test new strategies. In the second phase (2026–2030), schools will pass on their new strategies to other schools in order to extend the number of schools benefiting from the initiative.

Partnership/Collaboration: The initiative emphasizes ‘networking of schools with their social environment’ and ‘networking of schools with each other’.

Digital technology: Somewhat important. The programme includes the use of digital platforms to coordinate cooperation and exchange interim results.

INDIA

Title: Pradhan Mantri Uchchatar Shiksha Protsahan (PM-USP)

Beneficiary group/s: Students, girls/women, those of low socio-economic status

Implementer: Central Sector Scheme

Short description: PM-USP Yojna aims to provide financial aid to nearly 2 million students from economically weaker areas to enable them to pursue higher education during 2021–2026. PM-USP Yojana has three sub-components: (i) Central Sector Scheme of Scholarship for College and University Students; (ii) Special Scholarship Scheme for Jammu and Kashmir and Ladakh; and (iii) Central Sector Interest Subsidy Scheme and Credit Guarantee Fund Scheme for Education Loans. The programme is a Central Sector Scheme and the financial aid is provided by the Central Government. Students apply online to avail of the benefits.

Partnership/Collaboration: The different elements and institutions involved include: the National Scholarship Portal maintained by the Government of India; the Vidya Laxmi portal maintained by the Department of Financial Services; the Education Loan portals maintained by all the scheduled commercial banks of India and coordinated by the Canara Bank on behalf of the Ministry of Education; the Scholarship and Fellowship portals maintained by the Department of Higher Education and its autonomous organizations, the University Grants Commission (UGC) and the All India Council for Technical Education (AICTE); and the Scholarship and Fellowship portals maintained by other government ministries.

Digital technology: Essential. All the scholarship and fellowship schemes are implemented via online portals managed by different institutions/departments.

INDIA

Title: Rashtriya Uchchatar Shiksha Abhiyan (RUSA)

Beneficiary group/s: Students, teachers, institutions, girls/women, those of low socio-economic status, those in rural areas

Implementer: Ministry of Education, state governments, other institutions

Short description: RUSA is a Centrally Sponsored Scheme aimed at improving access and equity in higher education by providing adequate opportunities to access quality higher education to students from Scheduled Castes (SCs) and Scheduled Tribes (STs) communities, socially and educationally disadvantaged groups, women, transgender people and people with disabilities. The programme also enhances the overall quality of existing state higher education institutions (HEIs) by ensuring that all institutions conform to prescribed norms and standards, adopt accreditation as a mandatory quality assurance framework, and upgrade infrastructure, research facilities, capacity building and faculty training.

Partnership/Collaboration: The programme relies on partnerships across the spectrum, including between teachers, HEIs and non-governmental organizations involved in content/e-resource planning/aggregating/hosting, course/content development and delivery of lectures. The programme is implemented in partnership with States and Union Territories (UTs), other ministries, teacher training institutions and CSOs.

Digital technology: Essential. Encouraging the use of digital platforms is a priority initiative in increasing access to higher education. The program is monitored through online technologies to increase transparency.

INDONESIA

Title: Transformation of Education Funding and Governance

Beneficiary group/s: Students, teachers, principals, those of low socio-economic status, those in rural areas

Implementer: Ministry of Education, Culture, Research and Technology

Short description: The Transformation of Education Funding and Governance programme is aimed at improving education access throughout Indonesia. It is achieved through six channels: PIP/KIP (scholarships for Indonesian students), calibrated school assistance (BOS Majemuk), early childhood education assistance (BOP PAUD), community learning centre assistance (BOP Kesetaraan), the school activity plan and budget application (ARKAS) and the facility procurement system for schools (SIPLah). PIP/KIP aims to increase access to education by providing funds to students from poor and vulnerable groups to help them meet their educational needs from basic through higher education levels. BOS Majemuk, BOP PAUD and BOP Kesetaraan aim to support schools to fund their operational resources for providing education services. ARKAS and SIPLah aim to facilitate schools in managing the government assistance (BOS) fund in financing school activities and procuring necessary goods and services. Under these programmes, it is expected that schools will become more effective, efficient, transparent and accountable so as to avoid problems related to poor school governance.

Partnership/Collaboration: The Ministry of Education, Culture, Research and Technology is the institution in charge of implementing the transformation. The involvement and support of other parties, such as the Ministry of Home Affairs, the Ministry of Finance and the Ministry of Religious Affairs, are critical. Coordination and cooperation between the Central Government, the Regional Governments (provincial and district/city), schools and communities is also needed to implement these policies.

Digital technology: Essential. The implementation of ARKAS and SIPLah are centred around the development of an online platform to facilitate schools in managing government assistance (BOS) funds and procuring goods and services. Through ARKAS, schools can prepare budgets for their activity plans easily through an application developed by the Ministry of Education, Culture, Research and Technology. Through SIPLah, schools can engage in transactions to purchase the goods and services they need in an easy, safe and transparent manner.

JAPAN

Title: Attendance assistance at the compulsory education stage

Beneficiary group/s: Students, those of low socio-economic status

Implementer: Ministry of Education, Culture, Sports, Science and Technology

Short description: This programme provides necessary support to the parents and guardians of school-aged students for whom attending school has been deemed difficult due to financial reasons.

Partnership/Collaboration: n/a

Digital technology: Somewhat important. Digital technology will be used, among other things, to standardize systems such as the certification and provision of school attendance assistance in local governments, in order to simplify and expedite procedures and improve administrative efficiency.

JAPAN

Title: Learning support for Higher Education stage

Beneficiary group/s: Students, those of low socio-economic status

Implementer: Ministry of Education, Culture, Sports, Science and Technology, Japan Student Services Organization (JASSO)

Short description: This new learning support system for the Higher Education stage provides support for low-income households, so that students do not have to abandon their studies due to financial difficulties. The program is targeted at students attending universities (including graduate schools), junior colleges, colleges of technology and vocational schools, and provides exemptions from tuition and scholarships. JASSO also provides interest-free or low-interest rate loans and allows for the repayment of the loans to be spread out over a long period of time.

Partnership/Collaboration: n/a

Digital technology: n/a

JAPAN

Title: Support for high school students

Beneficiary group/s: Students, those of low socio-economic status

Implementer: Ministry of Education, Culture, Sports, Science and Technology

Short description: This programme aims to reduce the burden of educational expenses on parents and caregivers and so contribute to equal opportunities for education. The High School Tuition Support Fund covers tuition fees and the High School Supplemental Scholarship provides additional support and expenses for school supplies other than tuition fees.

Partnership/Collaboration: The system is operated by the Ministry of Education, Culture, Sports, Science and Technology in cooperation with the Digital Agency.

Digital technology: Somewhat important. For the High School Tuition Support Fund, applications are made online, and the target is a 70 per cent online application rate by the end of fiscal 2023.

THE NETHERLANDS

Title: Equal Opportunities Alliance

Beneficiary group/s: Students, especially those of low socio-economic status and those from migrant backgrounds

Implementer: Ministry of Education, Culture and Science, schools, municipalities

Short description: Within the Equal Opportunities Alliance, the government cooperates with schools, societal organizations and over 100 municipalities to foster equal opportunities in education, using approaches based on local needs and challenges. The government provides knowledge, data, research and financial backing to local initiatives that go beyond education and connect the different environments in which children live: school, home and their surroundings. For example, public libraries support initiatives that facilitate learning to read and school leaders are given more autonomy to implement diverse measures at schools.

Partnership/Collaboration: The Ministry of Education, Culture and Schoence cooperates with schools, societal organizations and over 100 municipalities to deliver the project.

Digital technology: Not important.

SAUDI ARABIA

Title: Developing education in remote areas

Beneficiary group/s: All citizens of Saudi Arabia, students, those in remote areas

Implementer: Ministry of Education

Short description: The initiative aims to improve access to education in remote areas through a review of the school network and the introduction of distance learning tools to ensure access to high-quality education for all students.

Partnership/Collaboration: n/a

Digital technology: Essential. This programme was created to ensure equal opportunities for all areas in Saudi Arabia. To do this, strengthening the existing ICT and internet infrastructure in remote areas is crucial.

SPAIN

Title: Programme for guidance, progress and educational attainment in schools of special educational complexity (PROA+ Programme)

Beneficiary group/s: Students, especially students in a situation of educational vulnerability in centres of special educational complexity

Implementer: The Education Administrations of the Autonomous Communities, the Ministry of Education and Vocational Training in the cities of Ceuta and Melilla

Short description: The goal is to provide resources to schools in order to offer an open, stimulating place for learning in which personalized learning methodologies adapted to the needs of all students are reinforced in order to reduce school failure and early school dropout rates. The programme is aimed at schools with special educational complexity, including schools located in rural areas. These are schools with a significant number of students in a situation of educational vulnerability, who face a series of difficulties or obstacles throughout their school career. In the majority of cases, these are schools located in socially disadvantaged areas and with pupils belonging to families with a low socio-economic and educational level.

Partnership/Collaboration: n/a

Digital technology: Somewhat important.

SPAIN

Title: Creation of personal and family accompanying and guidance units for educationally vulnerable students within the educational or psycho-pedagogical services located in school areas and districts

Beneficiary group/s: Vulnerable students at risk of repetition or early school-leaving

Implementer: The Education Administrations of the Autonomous Communities, the Ministry of Education and Vocational Training in the cities of Ceuta and Melilla

Short description: These units are aimed at supporting students' educational trajectory, by designing personalized formative pathways that promote the enrichment of unachieved learning in collaboration with guidance services, as well as strengthening the link between family and school and collaborating with other community resources to reduce absenteeism and early school-leaving. They promote multiple learning approaches and contexts, since non-formal and informal learning can play an important role in supporting the development of essential interpersonal, communicative and cognitive skills by facilitating educational transitions. The Guidance Units will be located in school areas or districts, according to the territorial organization of the educational guidance teams of the Education Administrations and taking into account the uniqueness of students in rural areas.

Partnership/Collaboration: The guidance will be developed through territorial cooperation with the Education Administrations of the Autonomous Communities and it will be published in the BOE (Official State Bulletin). The Ministry of Education and Vocational Training will execute the investment, as the Education Administration, in Ceuta and Melilla. Subsequently, technical cooperation on the programme will be developed and mechanisms for monitoring and verifying its implementation will be created.

Digital technology: Somewhat important.

3.5. Ensuring TVET systems support individuals' and economies' adaptability and resilience

Rapid changes in the world's economies and societies have created uncertainty for governments and for individuals. Evolving labour markets, increasing unemployment, ageing populations and workforces, technological advancements, and external shocks such as COVID-19 are just some of the challenges high on the agendas of policymakers around the world. Increasing and diversifying learning opportunities through TVET, which can help people to skill, upskill and reskill to meet the needs of the new age, represents an important opportunity to navigate these transitions, equipping individuals with the competencies they need for decent work and life. Improving equitable access to efficient and high-quality TVET that is relevant to job markets worldwide will help make best use of this opportunity.

The COVID-19 crisis has triggered major disruptions across the world by impacting every aspect of our lives and work. It accelerated pre-existing transitions in the world of work, in particular digitalization, and created extra layers of uncertainty as to which skills and competencies will be in demand in the future.

The global education community, including the TVET sector, has also been heavily impacted by the COVID-19 pandemic. The forced closure of TVET centres around the world during lockdowns significantly hindered the continuity of TVET provision. Although several alternative remote learning solutions were explored, the TVET ecosystem (from leaders to trainers and learners) proved insufficiently prepared for this sudden transition. According to a recent survey conducted by the International Labour Organization (ILO) on the effects of COVID-19 on skills provision¹³, the main problems were the lack of necessary skills and infrastructure to accommodate distance teaching and learning methods, as well as the financial constraints experienced by TVET providers.

Transitioning to distance learning also disrupted the delivery of forms of TVET that required face-to-face interactions. The provision of practical skills, particularly in the context of work-based learning (WBL), requires learners and trainees to participate in trainings at the workplace in the form of apprenticeships and internships. In most cases, lockdowns put a stop to those learning

modalities. The ILO survey shows that between 95 per cent and 100 per cent of respondent firms witnessed the disruption of WBL practices due to business closures. Even in the few cases where businesses in essential economic sectors (such as construction, manufacturing and personal services) remained open, on-the-job training activities either stopped or continued only in restricted ways, with strict health and safety measures, which hindered their potential and coverage.

In light of these challenges, G20 countries have prioritized strengthening and ensuring the continuity, quality and resilience of TVET systems (see Table 8).

A first cluster of interventions targets the attractiveness and inclusiveness of TVET systems, leveraging WBL, creating new learning pathways and placing TVET within a lifelong learning perspective. In England (the **United Kingdom**), for example, the White Paper *Skills for Jobs: Lifelong Learning for Opportunity and Growth* targets those progressing into the workforce after the age of 16 throughout their career. The reforms aim to raise the profile of technical and higher technical education by promoting higher-level technical qualifications that offer an alternative to a university degree. The reforms also expand access through apprenticeships and other skills reform programmes to enable adults and young people to train and retrain at any stage in their lives. It also reforms and simplifies funding allocations to give providers more flexibility and ensure a more effective accountability regime that can deliver value for money.

India's Programme on Vocational Education helps colleges and universities to offer skills-based programmes under the National Skills Qualifications Framework (NSQF). The main objectives of NSQF are to better integrate skills education into general education and provide access to education by offering flexibility through multiple entry and exit options. The initiative also focuses on youth employment needs by promoting active linkages between higher education institutions and industry.

Japan's Policy of the future of work post-COVID-19 promotes the role of professional training colleges. The intervention aims at improving the delivery of digital and other selected high-demand skills to workers, non-regular workers and unemployed people, to support their smooth transition to and from employment.

Mexico offers a flexible pathway to a technical certificate through the Dual Education in Upper Secondary

¹³ International Labour Organization, 2021, *Skills development in the time of COVID-19: Taking stock of the initial responses in technical and vocational education and training*, available at https://www.ilo.org/wcmsp5/groups/public/-ed_emp/-ifp_skills/documents/publication/wcms_766557.pdf.

Education initiative, in which students complete academic training in school while also receiving vocational technical training in a company. The initiative aims through real-life work experience to give young people the relevant professional and technical skills to facilitate their entry into the labour market.

At regional level, the European Skills Agenda is a **European Union** flagship programme that aims to support cooperation across EU Member States to achieve common goals in responding to the demand for new skills, including those needed for the digital and green economies.

Another set of interventions and programmes tackle capacity development, focusing on both TVET institutions and educators, with a view to increasing the quality, relevance and excellence of TVET provision. **Indonesia**, for example, has launched the Centre for Excellence Vocational High School (SMK PK) and Vocational Emancipated Campus (Kampus Merdeka Vokasi) programmes. The two initiatives aim at increasing the capacity of TVET educators, helping education unit leaders to be more agile in addressing changes and improving the formulation and adaptation of curricula. **France** has created a new infrastructure of Trades and Qualifications Campuses (campus des métiers et des qualifications), which act as hubs for vocational education and training excellence. **Saudi Arabia** also established Colleges of Excellence (CoE) to support the development of its International Technical Colleges project and deliver technical and vocational training in the country, in collaboration with international technical providers. **Türkiye** has also established a series of Sectoral Centres of Excellence (SCoE). To increase the quality of vocational and technical education, skills development will be upgraded in alignment with the European Quality Assurance Reference Framework for Vocational Education and Training and European Quality Assurance in Vocational Education and Training.

Some key interventions in this domain have involved infrastructure development, including improving connectivity. **South Africa**'s Research and Education Network (SANReN) focuses on the provision of connectivity for universities and TVET Colleges. Since August 2017, all TVET Colleges' campuses (including those in rural areas) have been connected to the SANReN through the TVET College Connectivity Project (TCCP), funded by the National Skills Fund (NSF). As a result, all TVET delivery and TVET campuses can access high-speed, high-quality and excess bandwidth.

Some initiatives are aimed at supporting the development of foundational and work-related skills. To this end, **Australia** expanded its Skills for Education and Employment (SEE) program, under the Australian

Government's skills reform agenda in 2021 to ensure more Australians could get help to improve their foundational skills, paving the way for further learning and skills acquisition over their lifetime. **Canada**'s Youth Employment and Skills Strategy Program (YESSP) promotes school-to-work transitions for young people aged 15 to 30, particularly those who face barriers to employment. The programme provides the ad hoc support they need to gain skills, work experience and abilities instrumental in finding decent jobs.

The development of skills at higher levels and the enhancement of qualification levels of citizens has been a key focus for G20 countries. **Italy**'s Reform of TVET and Higher Technical Institutes ITS (Higher VET) aims to align TVET curricula with the skills demands of the Italian labour market. Meanwhile, **Canada**'s Student Work Placement Program (SWP) supports the creation of work-integrated learning (WIL) opportunities to better prepare post-secondary students for work, de-risking employer hiring of students and enabling post-secondary institutions to keep pace with changing on-the-job expectations.

A number of programmes target linkages and partnerships with the private sector at national and economic sector levels. In **Spain**, the Plan on Vocational Education and Training, Economic and Social Growth, and Employability is a public-private collaboration that has led to the creation of a new single vocational education and training system to harmonize the validation and accreditation of professional skills. The initiative aims to support students who have been excluded from the labour market as a result of the COVID-19 crisis, to open up access to TVET and to provide career guidance services. One of the goals of **Türkiye**'s Sectoral Centres of Excellence is to facilitate cooperation between schools, social partners and the private sector to meet the demand for new skills.

Funding schemes to support upskilling and reskilling opportunities have been established in several countries. In **Australia**, the Job Trainer Fund offers upskilling and reskilling opportunities for job seekers and young people. The programme seeks to support 463,000 additional training places in both full qualifications and short courses in areas covering digital skills, aged care, disability care and childcare. Similarly, the country's Job Graduates Package aims at supporting job creation, with an ambitious target of 100,000 jobs by 2030. As part of this, the package specifically offers skills development programmes in the form of 50,000 short course places in 2021 and 2022. In **China**, the Employment Assistance Project for Students of Low Socio-economic Background offers online training to improve employability in its target group and is jointly supported by the Ministry of Finance and the Ministry of Education.

Table 8. Programmes/initiatives focusing on TVET and skills development

AUSTRALIA
Title: Job Trainer Fund
Beneficiary group/s: Students
Implementer: Australian Government Department of Employment and Workplace Relations
Short description: The programme aims to help job seekers and young people upskill and reskill, and is available over three years until 31 December 2022. It seeks to support 463,000 additional training places in both full qualifications and short courses in areas covering digital skills, aged care, disability care and childcare.
Partnership/Collaborations: Job Trainer funding is available for specific courses based on a list agreed between the National Skills Commission and each State and Territory Government. Each State and Territory Government determines which qualifications and short courses to prioritize from the list, and each State and Territory Government is responsible for the implementation and delivery of Job Trainer funded training places in their jurisdiction. The Australian Government and the State and Territory Governments have partnered on a 50:50 investment basis to offer the Job Trainer Fund.
Digital technology: Essential. Digital skills are prioritized and programme activity/target and digital platforms are leveraged to deliver the programme.
BRAZIL
Title: Governance of the Federal Network of Professional, Scientific and Technological Education (Rede Federal de EPCT, EPCT Federal Network)
Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff, community/partnership
Implementer: Ministry of Education
Short description: This programme aims to maximize the value of public management in supporting the EPCT Federal Network in fulfilling policies and ensuring effective resource use. The programme aims to strengthen the management of the institutions of the EPCT Federal Network, ensure use of renewable energies and energy efficiency, promote maker culture and create innovation spaces, promote training and valorization of professionals in the EPCT Federal Network and provide resources and educational support environments.
Partnership/Collaboration: The programme works directly with 41 of the 64 institutions that currently make up the EPCT Federal Network, all of which have administrative, patrimonial, financial, pedagogical and disciplinary autonomy. Under the Ministry of Education, the Secretariat for Professional and Technological Education (Setec/ MEC) is responsible for planning and developing the EPCT Federal Network, including ensuring appropriate resources are available. The programme's actions are carried out by the Ministry of Education.
Digital technology: Essential. Digital technologies have a fundamental role in the development of the programme's actions, several of which rely on the development of computer systems and support technologies. Moreover, all the teaching offerings of the institutions of the EPCT Federal Network are based on the intensive use of technology, and so the resources allocated are destined to improve the educational infrastructure of students' academic environments.

CAMBODIA

Title: Second Upper Secondary Education Sector Development Programme

Beneficiary group/s: Students, teachers, principals, school staff

Implementer: Ministry of Education, Youth and Sport

Short description: The programme focuses on improving access, quality and relevance in upper secondary education and strengthening the institutional capacity for planning, management and service delivery of the Ministry of Education, Youth and Sport (MoEYS). The programme will improve the quality of teachers in upper secondary schools, increase quality and labour market relevance in upper secondary education, and strengthen institutional capacity for planning, management and delivery of education.

Collaboration/Partnership: Financed by the ADB, the programme leverages the expertise of implementation partners KAPE and VSO in specific activities such as school-based management (SBM) and STEM.

Digital technology: Important. The programme intends to provide hardware and software for administering and piloting the continuing professional development and career progression dimensions of the programme, which aim to improve teachers' skills and qualifications.

CANADA

Title: Youth Employment and Skills Strategy Program (YESSP)

Beneficiary group/s: Students and young people aged 15 to 30, particularly those facing barriers to employment, including those of low-socio economic status, those in rural areas, linguistic minorities, those from migrant backgrounds, Indigenous people, youth with disabilities and visible minorities

Implementer: Employment and Social Development Canada

Short description: YESSP helps young people aged 15 to 30, particularly those facing barriers to employment, to get the information and wrap-around support they need to gain the skills, work experience and abilities needed for a successful transition into the labour market. Expected outcomes for youth range from job readiness to employment acquisition and career advancement.

Partnership/Collaboration: YESSP is a horizontal Government of Canada initiative led by Employment and Social Development Canada and delivered in collaboration with 11 other federal departments, agencies and Crown Corporations. Many YESSP departments, agencies and Crown Corporations work through third-party service providers, primarily non-profit organizations, to implement the programme.

Digital technology: Essential. YESSP is a key partner in the development of the Youth Digital Gateway, a single-window platform for youth to access information about youth supports offered by the Government of Canada. YESSP is also exploring the use of emerging digital tools and methodology to better understand the programme's reach and impact.

CHINA

Title: Employment Assistance Project for Students of Low Socio-economic Background

Beneficiary group/s: Students of low socio-economic background

Implementer: Ministry of Education, Ministry of Finance

Short description: The major objective of the programme is to assist students of low socio-economic background to resolve their employment problems, prepare them for work and facilitate their education-work transition by offering online and offline training on employability. By 2025, it is anticipated that the programme will offer offline training for 500,000 students and online training for 2 million students.

Partnership/Collaboration: The institutions responsible for the delivery of the programme are the Ministry of Education, the Central Special Lottery Public Welfare Fund of China and the Ministry of Finance. The programme has selected 135 universities and colleges as national training centres for employability and competency. Quality employability online courses are consolidated on the National Employability Training Network, an online platform which was created to assist students in employment.

Digital technology: Somewhat important. The programme offers online training opportunities to students from low socio-economic backgrounds, implemented via the National Employability Training Network.

EUROPEAN UNION

Title: European Skills Agenda

Beneficiary group/s: School staff, people in work

Implementer: The European Commission, led by DG Employment

Short description: The European Skills Agenda is a five-year plan to help individuals and businesses develop and use more and better skills, to aid recovery and further the EU's political priorities. With its 12 prescribed actions, it calls for joining up policies and approaches to ensure people have the right skills, provide supporting tools and initiatives, and unlock financing mechanisms. The Commission will support the acquisition of skills for the green transition under the programme.

Partnership/Collaboration: The Pact for Skills is a central part of the Agenda, bringing together private and public stakeholders that share the objective of up- and reskilling Europe's workforce to enable people to participate in the twin transitions. All these stakeholders will sign a Charter, co-created with stakeholders, which will define essential key principles, within their organizations and across their value chain or ecosystem. Four sectors are identified as priorities: Health, Construction, Automotive and Transport, and Tourism. The Pact also links in other EU initiatives for cooperation such as The Blueprint for Sectoral Cooperation on Skills, the European Alliance for Apprenticeships, and the Digital Skills and Jobs Coalition.

Digital technology: Essential. The Skills Agenda focuses on adult education to equip Europe's workforce with the skills to face the challenge of the digital transition, both at work and in daily life.

FRANCE

Title: The Trades and Qualifications Campuses

Beneficiary group/s: Students, teachers, companies, the economic sector, with a focus on those of low-socio-economic status; learners in upper secondary, including apprentices; young people (aged 15–29); adult learners; unemployed people and jobseekers; people in employment, including those at risk of unemployment; low-skilled and low-qualified people; companies; small and medium-sized enterprises (SMEs); VET providers (all kinds); social partners (employer organizations and trade unions)

Implementer: Directorate General for Schools in the Ministry of National Education and Youth and Ministry of Higher Education, Research and Innovation (*Ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation*)

Short description: Created in 2013, the Trades and Qualifications Campuses (*campus des métiers et des qualifications*) are hubs for vocational education and training excellence, which coordinate, at a local level, the work of secondary and higher VET institutions and businesses in given economic sectors. In 2018, a new generation of campuses was announced, with a new ‘excellence’ label distinguishing campuses that meet a strategic socio-economic challenge and that must meet more demanding criteria (the presence of higher education and research links with regional development policies and local companies; placements and international partnerships; infrastructure for sports, culture and student accommodation). Their aim is to contribute to the development of future jobs and sectors of excellence and become places for learning, living, innovating and promoting international strategies.

Partnership/Collaboration: The programme involves different ministries and bodies, including the Directorate General for Schools in the Ministry of Education and Youth, the Ministry of Higher Education, Research and Innovation, the Ministry of Labour and the Ministry of Economy. Local schools and businesses in the territory also contribute to the programme’s success.

Digital technology: Essential. Innovation is at the core of campus issues and digital technology plays a key role at every stage (economic sectors involved; training support; connecting education and business sectors, etc.).

INDIA

Title: Programme on Vocational Education

Beneficiary group/s: Students, especially girls/women, those of low socio-economic status, those in rural areas, youth of all backgrounds

Implementer: University Grants Commission

Short description: UGC’s vocational education programme facilitates colleges and universities to offer skills-based programmes under the National Skills Qualifications Framework (NSQF). The main objectives of NSQF are to integrate skills education with general education and to provide access to education by offering flexibility through multiple entry and exit options. The vocational education programme also aims to meet the employment needs of youth by promoting active linkages between HEIs and industry.

Partnership/Collaboration: The vocational education programme promotes close collaboration between HEIs and the industry: as per UGC Guidelines related to NSQF, HEIs need to develop course curricula in consultation with industry partners. Similarly, the Guidelines for the apprenticeship-embedded degree programme pave the way for providing apprenticeships to students in various industries.

Digital technology: Essential. Though the skills-based programmes are offered offline, a number of institutions offer IT-based courses. Moreover, the Government of India’s recent Skill Hub Initiative has placed more focus on digital interventions.

INDONESIA

Title: Transformation of Vocational Education

Beneficiary group/s: Students, teachers, principals

Implementer: Ministry of Education, Culture, Research and Education

Short description: The Ministry of Education, Culture, Research and Technology takes a comprehensive approach to encouraging linking and matching with industry, allowing education units to provide industry-based learning that prepares graduates to work and become entrepreneurs. To that end, the Ministry of Education, Culture, Research and Technology launched the Centre for Excellence Vocational High School (SMK PK) and Vocational Emancipated Campus (Kampus Merdeka Vokasi) programmes to encourage change through interventions in various aspects of vocational education. These include increasing educators' technical capabilities, building education unit leaders' capacity to be more agile in leading change, improving the quality of practical facilities and infrastructure in line with the needs of the world of work, formulating curriculum policies that allow for optimal alignment with the competency needs of the world of work, determining institutional policies that allow for unrestricted learning between secondary and higher education levels, and, most importantly, increasing opportunities for the world of work to be directly involved in education units. It is hoped that these changes will enable educational units to provide students with industry-based learning, allowing them to maximize the development of their abilities, talents and interests.

Partnership/Collaboration: The Indonesian Ministry of Education, Culture, Research and Education implements this programme in coordination with local governments, vocational universities and the National Accreditation Body for Higher Education (BAN-PT).

Digital technology: Essential. Technology is used in the programme to train educators throughout Indonesia, to ensure better school evaluation and management, and to reach out to and match industry with education units.

JAPAN

Title: Policy of the future of work post-COVID-19

Beneficiary group/s: Those of low socio-economic status

Implementer: Ministry of Education, Culture, Sports, Science and Technology

Short description: This policy aims to provide programmes at universities and professional training colleges that meet the needs of society, with a focus on the digital field and other growth fields, for workers, non-regular workers and unemployed persons affected by new COVID strains, and to support people's smooth transition to and from employment.

Partnership/Collaboration: The Ministry of Education, Culture, Sports, Science and Technology partners with universities, professional training colleges and other educational institutions, labour bureaux and private companies to deliver this programme.

Digital technology: Manapass, a portal site operated by the Ministry of Education, Culture, Sports, Science and Technology that provides information on courses for working adults, will be used to disseminate information on courses and the results of this project.

MEXICO**Title:** Dual Education in Upper Secondary Education**Beneficiary group/s:** Students**Implementer:** Vice Ministry of Higher Secondary Education

Short description: One of the objectives of the Education Sectoral Education Programme 2020–2024 is to guarantee the right to an education of excellence and relevance in each of the different types, levels and modalities of the National Educational System, through the Priority Strategy ‘Consolidate, with the participation of the productive sectors, the Dual Education System in the upper middle and upper type that allows the young people to develop relevant skills and offers options for incorporation into the labour market.’ The General Education Law provides for the provision of dual education, with school and company training, in upper secondary and higher education. In this context, dual education has been strengthened and made more flexible through the publication of a normative agreement that allows for dual education in the subsystems of technological upper secondary education and technical professional education, and assures the design and promotion of flexible curricular paths based on learning quality and integral training, so that young people can develop knowledge and skills in real learning contexts.

The programme involves a system in which students complete their basic training on an academic platform and receive vocational technical training in a company. The programme is based on a link between the productive and educational sectors, who collaborate to provide students with the opportunity to train both academically and professionally. Companies invest in this programme and ensure that on graduation, students have the necessary competencies and skills to enter the workplace in which they have been trained.

Partnership/Collaboration: The Vice Ministry for Higher Secondary Education coordinates the programme, and the subsystems of upper secondary education in technological and technical vocational training participate in it, as well as the CONOCER and the General Directorate of Training Centres for Work (DGCFT), along with companies and business chambers. The German Government cooperates through the Ministry of Education and Research and the Ministry of Economic Cooperation and Development operating through GIZ. The Mexican-German Chamber of Commerce and Industry (CAMEXA) also participates. It is a permanent programme, which operates with resources provided by the Ministry of Economic Cooperation and Development from the German Government through GIZ.

Digital technology: Essential. Technology is used both for training students and to establish links between companies and schools. It is also fundamental for information management, academic follow-up of students and other academic and administrative actions. The programme is based on an Information System supported by two platforms, one academic and another for companies to register.

SOUTH AFRICA**Title:** South African Research and Education Network (SANReN) Connectivity (including the TVET College Connectivity Project, TCCP) for universities and TVET Colleges**Beneficiary group/s:** Students, principals, lecturers, those of low socio-economic status, those in rural areas**Implementer:** Department of Higher Education and Training (DHET)

Short description: Implemented through collaboration between the Department of Science and Innovation (DSI), the Council for Scientific and Industrial Research (CSIR) and DHET, SANReN was established to provide universities and TVET colleges, among others, with access to connectivity and internet access. To date, all 26 public universities and their campuses (to a total of 350 sites and offices) across all 9 provinces have access to broadband connectivity.

The SANReN backbone has received substantial capital funding from the National Treasury through both DHET and the then Department of Science and Technology, now DSI. In order to provide more access points for students and staff to broadband connectivity, almost all universities have subscribed to EduRoam (educational roaming), which offers secure, worldwide roaming access services to the international research and education community. All TVET colleges' campuses (despite most being in rural locations) are currently connected to the SANReN through the TVET College Connectivity Project (TCCP) funded by the National Skills Fund (NSF) since August 2017. All TVET Colleges' campuses receive the same high speed, high quality and excess bandwidth.

Partnership/Collaboration: The initiative is implemented through collaboration between the Department of Science and Innovation (DSI), the Council for Scientific and Industrial Research (CSIR) and the Department of Higher Education and Training (DHET). Non-state actors involved in the programme include the Tertiary Education and Research Network (TENET) and network operators.

Digital technology: Essential. DHET has adopted open learning as a strategy to increase access to education and training opportunities and to construct quality learning environments which take account of students' contexts and use the most appropriate and cost-effective methods and information and communication technologies (ICT). Furthermore, the use of ICT, including digital and technological solutions in education and training, have been up-fronted and fast-tracked to ensure education and training continuity in the context of the COVID-19 pandemic.

SAUDI ARABIA

Title: International Technical Colleges

Beneficiary group/s: Students, girls/women, those in rural areas

Implementer: Technical and Vocational Training Corporation (TVTC), a government organization that operates vocational education colleges and institutes in Saudi Arabia, and Colleges of Excellence

Short description: Colleges of Excellence (CoE) were established to support the delivery of the International Technical Colleges project. The partnership seeks to support the employment of young women by skilling them through international standards at the International Technical Colleges operated by colleges from developed countries. This will increase their English level skills and other employment-related skills. The project includes: a) developing the TVET curriculum in Saudi Arabia in collaboration with international technical providers; b) upgrading and improving regulatory capacity in TVET by strengthening the involvement of the private sector in National Occupational Skill Standards and in contributing to on-the-job training; c) rapidly expanding the capacity of the system from 110,000 students in 2013 to approximately 400,000 students over 10 years; d) investing in all means required to upgrade the quality of the system and meet the highest international standards; e) providing education through a Public–Private Partnership (PPP) model; f) providing existing high-quality, large-scale vocational college buildings for international training providers; g) training Saudi students in a set of pre-selected specialties in a modular, three-year programme leading to a diploma qualification; and h) compensating training providers through a combination of per-student base-funding and a performance-based component dependent on the results of a neutral third-party college inspection, student performance in national tests, and graduate employment levels.

Partnership/Collaboration: TVTC cooperates with international education providers to deliver this project.

Digital technology: Somewhat important. Colleges of Excellence have made use of subject matter experts in English and other specializations delivered by the colleges to devise banks of questions to test knowledge and skills. These question banks will be used to ensure that students complete computer-based tests independently of the college. The platform can deliver random questions to students in the same sitting to ensure complete independence, but this is not used at present as it does not allow for benchmarking due to the different questions. Colleges also have to upload all student completed assignments to the eCaps system to allow for electronic internal verification and subsequently electronic external verification against the specified learning outcomes.

SPAIN

Title: Plan on Vocational Education and Training, Economic and Social Growth and Employability

Beneficiary group/s: Students, teachers, school staff and training providers, SMEs, social agents

Implementer: Ministry of Education and Vocational Training

Short description: This plan is aimed at launching a new, unified Vocational Education and Training system, which will be effective and efficient and guarantee vocational education and training and lifelong learning among students and the active population. It will create a generalization of procedures for validating and accrediting professional skills aimed at the active population, especially at those excluded from the labour market during the COVID-19 crisis. It will support those excluded from the labour market during the pandemic through providing completely flexible vocational education and training plans, tailored to the exceptional circumstances, in order to complement the accredited skills. It will resize vocational education and training provision, create a collaborative ecosystem, specialized in vocational education and training, and provide continuous public–private collaboration.

Partnership/Collaboration: The programme will be implemented through a collaboration between the Ministry of Education and Vocational Training and Regional and local administrations.

Digital technology: Essential. Innovation and digitalization is one of the strategic guidelines and objectives of the plan. It involves training students, trainers and the population in general in the acquisition of basic digital competences. It also involves the integration of digital tools and applications in the general population and world of work.

TÜRKİYE

Title: Improving the Quality of Vocational Education and Training through Establishment of Sectoral Centres of Excellence

Beneficiary group/s: Teachers and principals

Implementer: Ministry of National Education

Short description: This project will increase the quality of vocational and technical education through developing knowledge, skills and competencies in line with the European Quality Assurance Reference Framework for Vocational Education and Training and European Quality Assurance in Vocational Education and Training. This will involve training teaching and administrative staff, improving learning environments, providing VET as an attractive option for students, and strengthening cooperation between schools, social partners and the private sector through the establishment of Sectoral Centres of Excellence (SCoE). Some 15 Sectoral Centres of Excellence will be established; 14 of them will cover 25 fields of vocational education and 1 will cover vocational foreign language, mathematics and science.

Partnership/Collaboration: The professional development of laboratory, science, mathematics and foreign language teachers will be supported through these centres of excellence, which will strengthen the bridge between the business sector and education. Equivalents of these centres will also be established in the business sector. Institutions and organizations such as the Union of Chambers and Commodity Exchanges of Türkiye (TOBB), the Confederation of Turkish Tradesmen and Craftsmen (TESK), the Confederation of Turkish Real Trade Unions (HAK-İŞ) and the Turkish Confederation of Employer Associations (TİSK) are also part of programme delivery.

Digital technology: Essential. Digital skills training will be provided to 1,250 teachers of workshop and laboratory. The ICT infrastructure of the centres of excellence to be established will be strengthened.

UAE

Title: Applied Stream and Academies

Beneficiary Group: Students and Teachers

Implementer: Ministry of Education - UAE

Short Description: The UAE's Applied Stream and Academies program promotes vocational related qualifications that support skills development in various subjects and industries, as well as the development of employability skills through the CoreLife Skills. The program promotes new TVET qualifications, new applied and vocational subjects, and the integration of employable, transferable 21st century skills across all subjects through real-world application.

Teachers are supported through continuous professional development programs offered at National Vocational Qualifications for Nurseries (NQC) and Applied Stream Child Development vocational qualification - Cycle 3.

UNITED KINGDOM (ENGLAND)

Title: Skills for Jobs Lifelong Learning for Opportunity and Growth

Beneficiary group/s: Post-16 and adult learners, further education teachers, employers

Implementer: Department for Education

Short description: The Skills for Jobs initiative will reform the skills sector by putting employers at the heart of reforms to tackle skills gaps, providing businesses with the talent they need to thrive. This will help to ensure more people can get the skills they need to get good jobs, wherever they live. The reforms will give people the opportunity to train, retrain and upskill flexibly throughout their lives to get great jobs in sectors needed by the economy, which will boost productivity.

Partnership/Collaborations: Different components of the programme are to be jointly delivered with the following departments: Department for Business, Energy and Industrial Strategy (BEIS), Department for Digital, Culture, Media and Sport (DCMS), Department for Work and Pensions (DWP) and Department for Levelling Up, Housing and Communities (DLUHC).

Digital technology: Somewhat important. The programme involves improving access to digital platforms and plans to strengthen the digital skills of beneficiaries.

UNITED STATES

Title: Challenges and Prizes in Career and Technical Education

Beneficiary group/s: Students, teachers, schools

Implementer: Department of Education, Division of Academic and Technical Education of the Office of Career, Technical, and Adult Education (OCTAE) (primary responsibility), the General Services Administration

Short description: This programme aims to increase access to and expand the capacity of career and technical education (CTE). The programme supports the development of high-quality CTE programmes by engaging students in challenges that require innovative approaches to address issues that affect individuals, families and communities throughout the nation with potential to provide impact on the global scale. Challenges are released annually at www.challenges.gov and can vary in duration. The series of prize competitions are collectively referred to as Ed Prizes and the current challenge is the **Rural Tech Project** (past challenges include **CTE Mission: CubeSat**, **EdSim Challenge**, **CTE Makeover Challenge**, **Reach Higher Career App Challenge**). Any school with a designated CTE programme can participate in submitting ideas for challenges.

Partnership/Collaboration: Workforce/industry partnerships are integral to the success of the challenges. The programme seeks support from business and industry partners to judge challenges and serve as subject matter experts and industry sponsors.

Digital technology: Essential. Digital technology usage is not a requirement set forth in the challenges. However, the challenges inherently require use of digital technology to be successful. The use of ICT tools to be successful include, but are not limited to, word processing and spreadsheet applications.

3.6. Leveraging digital technology

In most G20 countries, the widespread use of digital technologies during COVID-19 distance education transformed students' learning experiences well beyond the pandemic. Digital access and pedagogical preparedness posed challenges that were often drawn across lines of social marginalization, but in the effort to confront the crisis, positive lessons emerged about the effective use of educational technologies. Education ministries are swiftly acting on these insights, in waves of reforms that anticipate and evidence the growing prevalence and dominance of digital technology in daily life.

Countries reported that digital technology was either *essential* or *somewhat important* to the implementation of the majority of G20 programmes and policies, illustrating the cross-cutting nature of most G20 countries' digital strategies. G20 countries demonstrate a growing commitment to leveraging the digital to improve educational access, inclusion, management, performance, outcomes and preparedness for an age in which datafication and digitalization determine national and international agendas.

An analysis of programmes related to digital technology in education reveals eight major thematic trends (see Table 9). Although not every G20 country has programmes dedicated to each one of the eight themes below, the issues appear across a majority of G20 survey reports.

Digital infrastructure

Most G20 countries are heavily investing in improving and upgrading digital hardware and software at the individual and classroom levels, including through device and internet provision that target persistent gaps.

In **France**, for example, a €131 million endowment fund will ensure that all schools are equipped with a minimum common digital base, including video projectors, shared mobile equipment, equipment specific to elementary schools, and a network allowing both onsite and remote teaching through classroom-based equipment for hybrid teaching in high school. In **Germany**, the DigitalPakt is making over €7 billion available for investments in digital education infrastructure. **India** is expanding and strengthening its digital infrastructure across the country and is giving digital devices to students and teachers through collaboration between governmental and non-governmental agencies. Meanwhile, **Indonesia's** School Digitalization programme extends ICT support to schools that previously could not access quality resources, using a

needs-based investment which takes into account the school's characteristics and the usability of existing equipment.

In **the Netherlands**, €8.5 billion has been allocated to post-pandemic education recovery plans, and part of that will be used to supply schools with additional digital resources. Through its ICT in Education Policy, **Rwanda** is rapidly expanding digital device acquisition, school connectivity and digital content.

In England (the **United Kingdom**), 1.95 million laptops and tablets were delivered to schools, trusts, local authorities and further education providers during the pandemic, bringing the total investment to support remote education and online learning to over £520 million. In Scotland (the **United Kingdom**) at the onset of the pandemic, £25 million was provided to local councils to tackle digital exclusion, resulting in 72,000 devices and 14,000 internet connections being provided to learners. For 2022/23, £15.3 million has been committed to improving digital infrastructure in schools across Scotland, and the Scottish Government has committed to ensuring access to a device for every child by 2026.

Some countries are targeting increased connectivity. In **Brazil**, the Wi-fi Education programme targets about 500 public schools with no or low connectivity and with high rates of age and grade distortion. The Connected Education Innovation Programme (PIEC) aims to reach 100 percent of Basic Education students by 2024, and already, \$64 million has been invested in 102,000 schools. In **China**, all primary and secondary schools have secured internet access, and all classrooms in **Türkiye** have been provided with high-speed internet connections.

The **UAE** stepped up digital infrastructure at all levels of schooling; teachers are regularly trained to guide students throughout their digital learning journeys, ensuring software, hardware, and reliable internet connectivity at all times.

Creating the infrastructure for smart classrooms and virtual learning environments is an objective for many G20 countries. In **Cambodia**, digital technology is being integrated to create smart classrooms that will enable greater use of technology in teaching and learning in all Secondary Resource School networks and New Generation Schools (including through television and radio). In **India**, the Samagra Shiksha (Integrated Scheme for School Education) programme aims to enhance educational access by providing support for ICT labs, integrated teaching and learning devices, and an open-source operating system, as well as hardware, software, training and resource support for online and smart classrooms.

Italy is committed to the transformation of school spaces from traditional classes into innovative learning environments, both physical and virtual, connected to the internet to integrate in-presence and digital teaching and learning systems, and to training school staff and students on digital transition development.

The **Republic of Korea** is developing a project aimed at providing a combination online and offline educational environment and establishing a future-oriented teaching and learning-based system that can support customized learning for students, using hybrid cloud-based infrastructure involving artificial intelligence (AI), big data and cloud technologies. In **Saudi Arabia**, digitally enhanced schools are equipped with the latest and most advanced equipment, an advanced digital library and virtual laboratories. In India, the Samagra Shiksha (Integrated Scheme for School Education) programme aims to enhance educational access by providing support for ICT labs, integrated teaching and learning devices, and an open-source operating system, as well as hardware, software, training and resource support for online and smart classrooms. **Spain's** Plan for Digitalization and Digital Competences of the Education System will install and maintain 240,000 interactive digital classrooms to enable blended learning and will provide teacher training in the use of this technology as well as 150,000 devices for students, at a cost of €827 million. This forms part of the €1.5 billion from Spain's allocation of the EU-funded Recovery, Transformation and Resilience Facility earmarked for the digitalization of the education system. All classrooms at lower and upper secondary education level in **Türkiye** have received interactive smart boards, and teachers have been trained in the use of these smart boards in the classroom.

Blended and hybrid learning modalities

Many G20 countries are enhancing and expanding blended and hybrid learning modalities even beyond temporary emergency situations. One such hybrid model entails the synchronous instruction of onsite and online students through hybrid-capable classroom spaces, or a blended combination of online and in-person coursework. In some G20 countries, such modalities were initially used to enable learning continuity for students or teachers temporarily absent from the classroom for health reasons. Hybrid models of learning, made up of varied balances of in-person and virtual activities, take many forms and approaches. Some examples in G20 countries are examined below.

Canada's Province of Ontario has introduced an online learning graduation requirement. The online learning courses are delivered by Ontario's publicly funded secondary schools and are teacher-led, with content offered through a secure learning management system and Virtual Learning Environment. The government has mandated a blended learning approach by requiring all students to earn two online credits to graduate from secondary school. **India** is creating virtual labs, including leveraging existing e-learning platforms such as DIKSHA, SWAYAM and SWAYAMPRAHNA, to give all students equal access to quality, practical and hands-on experiment-based learning experiences. The possibility of providing adequate access to socio-economically disadvantaged students and teachers through supplying suitable digital devices, such as tablets with preloaded content, will be considered and developed. **Saudi Arabia's** Madrasati Learning Management System is a digital content repository that enables several e-learning models: blended, synchronous, asynchronous, distance learning and face-to-face technology-enhanced learning.

Australia and **India** have established research teams or pilot studies dedicated to evaluating remote and online learning in order to identify the benefits and drawbacks of various e-learning models. **France** and **Japan** are continuing to research hybrid models of participation, investigating the potential benefits for teachers and learners from increased inclusion and flexibility, since this model may enable participation, for example, throughout long periods of hospitalization, during educational care at home, or when geographic barriers to participation need to be overcome.

Digitalization and centralization

Many countries are digitalizing and centralizing curriculum-aligned materials to support hybrid online-offline interoperability across all levels of education. For example, **Argentina's** CONECTAR IGUALIDAD provides a digital platform with open educational resources, created collaboratively by all the country's jurisdictions, as well as a system of virtual classrooms to enable teachers to prepare their classes online. **Australia's** Digital Technologies Hub and the Learning Potential app provide learning resources and services for teachers, students and parents, and support remote and online learning for those experiencing economic and social disadvantage.

Indonesia's Ministry of Education, Culture, Research and Technology has created and improved education platforms by designing learning media and resources that can be used by teachers in their classrooms. The **Republic of Korea's** Integrated Digital Platform for Teaching and

Learning provides an online and offline educational environment that helps students to actively cope with rapidly changing environments. Alongside the unified e-learning platform, Madrasati, **Saudi Arabia**'s Rawdati platform is an interactive Saudi model for distance education that offers high-quality synchronous and asynchronous interactive education for kindergarten children and provides a variety of services for parents and practitioners. **Türkiye**'s OGMMATERYAL internet site includes activities for textbooks prepared by the Ministry of National Education, as well as interactive applications, projects, a question bank, dynamic applications, 3D modelling, experiments and exam preparation applications, all of which are accessible from the ministry's centralized website. And in England (the **United Kingdom**) the Get Help with Remote Education initiative provides a one-stop-shop for teachers and leaders, signposting the support packages available. This includes a self-assessment framework to help schools and further education institutions assess their remote education provision; help to access technology that supports remote education; resources, peer-to-peer training and guidance on how to use technology effectively; and school-led webinars to support effective curriculum delivery.

Other countries are still developing their digital platforms. **China**'s Ministry of Education plans to build Smart Education of China (an online platform) into a national education resource hub for education, including basic education, TVET education and higher education, integrated with other resources including after-class services, faculty training, home education, pedagogical reform practices, and more. Currently, the upgraded platform has a collection of more than 21,000 resources, which cover pre-school education, compulsory education, high school education and special education. **Italy**, meanwhile, is developing an integrated system to enhance students' digital skills, involving the implementation of digital skills curricula in every grade of school, the design of digital platforms to develop teachers' and students' digital skills, and specific measures to promote the digital inclusion of all students and to enable innovative teaching methodologies. **Rwanda**'s ICT in Education Policy aims to develop and use digitalized content for all levels of education.

The **United Arab Emirates** has worked to develop a fully functional holistic and integrated digital ecosystem within the Emirati school model, which promotes unified and continuous learning from early years to higher education (K-20). In partnership with the Arab League Educational, Cultural and Scientific Organization (ALECSO), the United Arab Emirates' Mohammed Bin Rashid Smart Learning

Programme (MBRSLP) will implement a fully integrated smart digital ecosystem of learning in a model school in all ALESCO member countries to support inclusivity and to advance progression in personalizing the learning experience. Another model for a free e-learning experience is the United Arab Emirates' Madrasa programme, which provides 5,000 free Arabic videos in general science, math, biology, chemistry and physics, as well as 11 million words of educational content, to students from kindergarten to grade 12. It is accessible online to over 50 million Arab students around the world.

Digital skills in curriculum revision

Many countries have incorporated the development of 21st century skills and digital skills as core competencies in national curriculum revisions, especially within the TVET sector. To develop these competencies, the use of ICT must be integrated across curricula so that students can learn *to use* ICT while learning *with* ICT. Through wide-ranging policies targeting the acquisition of digital skills, G20 countries have committed to ensuring that all citizens can develop the digital competencies needed to participate in and contribute to society and the economy.

Mexico's Common Curricular Framework for Upper Secondary Education (MCCEMS), to be published in mid-2022, is integrating 21st century skills into the country's curricula. **South Africa** has established the Strategy for Expanding Online Learning in Post-School Education and Training: Towards a National Educational Network for PSET (post-school education and training). This strategy provides for a well-coordinated, comprehensive, efficient and supported network infrastructure to enable access to education and training in the post-school education and training system. The **Republic of Korea**, **Spain** and **Türkiye** are similarly integrating digital competencies and content into vocational education and training.

Many European countries, such as the **Netherlands**, are revising curricula to include digital literacy as a core competence for primary and secondary education. In fact, the second strategic priority of the **European Union**'s Digital Education Action Plan is enhancing digital competences and skills for the digital transformation, which includes the development of basic digital skills from an early age and the development of advanced digital skills to produce more digital specialists and ensure that girls and young women are equally represented in digital studies and careers. The **United Arab Emirates** is likewise upgrading and revising its digital curriculum, introducing advanced skills such as coding as early as age 4.

Pedagogical adaptation and innovation

Many G20 countries have planned significant reforms to prepare teachers for an age of digitally enhanced pedagogy by ensuring that all educators have the capacity and opportunity to effectively use ICT tools and digital resources in their professional practices. This includes training for pedagogical adaptation and innovation, including increased investment in the concept of personalized learning supported by AI-driven tools. Programmes target the use of ICT in teaching and learning, supporting teachers' digital competences and expanding capacities to support disadvantaged students through assistive technology. G20 countries aim to support all teachers across all subject areas to be prepared to use ICT and teach about the use of ICT. As such, many countries have increased their efforts to provide both initial and ongoing professional development that teaches educators how to use, teach with and deliver lessons through ICT.

Brazil is developing Laboratories of Creativity and Innovation for Basic Education in each of the 26 Brazilian states and in the Federal District to promote teacher and educational manager development in the pedagogical use of technologies, so as to meet the demands of the current educational context. **Mexico** recognizes teachers as indispensable agents of change in transforming teaching in classrooms and campuses, so updating and training has been an important pillar in the country's programme of curricular change. The reform aims to sensitize teachers to the need for change, as well as to guide them to a different way of thinking through providing them with the relevant elements for the curricular change. Teacher training processes are carried out online, and a platform has been developed to monitor participating teachers' progress and guide their trajectory. The **Russian Federation**'s national project Education targets the development of teachers' skills in a contemporary educational environment through the implementation of advanced training programmes, methodological support and support for teaching staff and education management personnel.

Japan and **Saudi Arabia** present good examples of pedagogical innovation. Japan has developed a learning management system and associated content to realize experiments and practical training using virtual reality (VR) under its programme to support hybrid education and provide large-scale financial support for improving the environment at universities. Saudi Arabia is using an electronic training system to provide distance training programmes to sustain educational professional development processes for those in educational jobs, as

well as to keep pace with global trends towards e-training systems, which are characterized by flexibility of time and place. Saudi Arabia provides training using VR and augmented reality techniques, targeting students in technical colleges from all regions of the country.

India's National Education Policy 2020 envisages the use and integration of technology for improving multiple aspects of education including professional development of teachers, strengthening of teacher education institutions, etc. Among the many initiatives, the National Initiative for School Heads' and Teachers' Holistic Advancement (NISHTHA) is an integrated programme aimed to build the capacities of around 4 million participants covering all teachers and Heads of Schools at the elementary level in all States and union territories (UTs). Efforts are towards strengthening and upgrading of the State Councils for Educational Research and Training (SCERTs)/State Institutes of Education, and the District Institutes for Education and Training (DIET) as nodal agencies for teacher training.

Data systems and information management

Many G20 countries are expanding learning data systems to improve education management, monitoring and evaluation. G20 countries' reforms on digital transformation in education frequently aim to improve leadership and management procedures and practices across the system through the adoption of digital tools and the increased use of data and information in professional culture. Many countries aim to further develop ICT leadership capacity across the education system and transform information into a tool for educational improvement.

In **France**, the first of two measures targeting the digital modernization of the education system aims to provide digital services to sustain administrative continuity (€32 million), which will facilitate administrative follow-up and management of primary and secondary schools. In **Germany**, Innovationswettbewerb INVITE is directed towards enabling and realizing the connection and interoperability of platforms, making platforms easier to use, and leveraging AI technologies to design individualized learning processes that make use of data analytics.

The National Education Policy released by the Government of **India** in 2020 specifies the use of formative assessments to help identify at-risk students for whom appropriate support centres will be established. Meanwhile, the National Digital Education Architecture (NDEAR) plans to enhance the efficiency of India's data collection,

monitoring and evaluation by developing digital applications to support not only teaching and learning activities but also educational planning and governance-related administrative efforts by the Government and the states/union territories.

In 2021, **Indonesia**'s government released a regulation that allowed for alterations to data collection and data distribution in the education evaluation process. This transformation of the evaluation of the education system aims to ensure measurement of access, quality, relevance and governance of education administration; an integrated and shareable data management system on access, quality, relevance and governance of integrated education administration; alignment of programmes and policies for the management of education administration between the central government and regional governments; and improvement of access, quality, relevance and governance in sustainable education.

Italy is ensuring the exchange of data and information between the education ministry, the regions, the autonomous provinces and the local authorities by activating a national information system of children's educational services which educational services authorized by local authorities must join. **Mexico** is developing a Statistical System of Upper Secondary Education, which is a platform facilitating the collection, processing and use of information generated by schools and authorities about upper secondary education. **Rwanda**'s ICT in Education plan includes a data management system enabling attendance to be tracked on a daily basis in real time by different stakeholders through digital applications used by teachers.

In **Saudi Arabia**, the Human Capability Development Program includes several initiatives focusing on data systems and information management. The Unified Digital File programme aims to develop a consolidated digital system that includes all student information and data. Digital files for students will include personal information, psychological, social and educational data, as well as a record of skills and knowledge to measure learning outcomes and to facilitate the use of diagnostic tools, including the detection of students at risk. Saudi Arabia's Education data management and Education data sharing initiatives aim to develop a system and platform for sharing education data electronically. The initiative is planned to increase transparency in education and support future decisions and plans.

Safety, security and regulation

Some G20 countries are strengthening regulatory frameworks to ensure safe and secure digital learning environments and data sharing practices. Overall, G20 countries focus to different degrees on data privacy and security both within and alongside digital technology programmes and policies in education. As part of their efforts to leverage technology for education system management, countries have adopted varying approaches to privacy and security, including protective frameworks, either general or tailored to the educational context, with a view to enforce the protection of learners' data. Some countries have also adopted non-regulatory responses such as capacity building, empowering learners and educators, and privacy by design.

England (**United Kingdom**) is a model for ensuring data privacy and security in the schooling system. CyberFirst is a Government cybersecurity learning programme that supports the development of an advanced digital economy for secondary school children and beyond. Since 2016 we have seen 55,000 students engaged with the courses and the CyberFirst Girls programmes, and 1,100 successful CyberFirst Bursary applicants. Its Levelling Up Education standards programme has a goal of improving cyber capability and cybersecurity in schools and colleges to deliver high-quality remote education. **India**'s National Digital Education Architecture (NDEAR), an architectural blueprint for the educational ecosystem, ensures data empowerment and protection of individual privacy and confidentiality, with privacy by design dictating the use of minimal Personally Identifiable Information (PII). Consent architecture is strictly followed, in adherence with India's data protection bill and laws.

In the **United States**, the CTE CyberNet is a network of teacher professional development intensive academies led by 2-year and 4-year postsecondary institutions designated by the National Security Agency (NSA) as Centers of Academic Excellence (CAE). The CTE CyberNet initiative was strategically designed through an ecosystem approach to develop the cybersecurity skills of high school teachers and to create local support networks that increase the sustainability of these academies. The programme aims to rapidly increase the capacity of high school teachers to teach CTE cybersecurity courses, thereby preparing students with the range of knowledge, skills and abilities to enter cybersecurity career and educational pathways.

In the **European Union**, under the Digital Education Action Plan adopted in September 2020, the first priority involves developing a European digital education ecosystem that

includes ‘user-friendly tools and secure platforms which respect privacy and ethical standards.’ Action 11 of the plan is the cross-national collection of data on student digital skills. In **Germany**, the digital strategy specifies five central social areas which will help to shape the digital change. One of them is to ‘Create trust and provide security’. The **Netherlands** created a ‘privacy covenant’ with the goal of setting clear standards on the processing of personal information for educational purposes, especially with regard to dependency on Big Tech companies. In **Spain**, one of the actions of the Plan of Digitalization and Digital Competences of the education system is to renovate the VET catalogue and design new digital qualifications, such as Cybersecurity in IT environments.

In **Cambodia**, the Ministry of Education, Youth and Sport’s digital technology plan for secondary education includes integrating awareness on ‘cyber bullying’ and identifying and strengthening safeguards against online abuse and security in digital education. **Saudi Arabia**’s programme of curriculum revision and updating to enhance basic and future skills includes programming from the first grade of primary school, including teaching digital safety, protection against threats and personal data management. The Madrasati digital platform provides a high-security centralized system that offers on-demand access to shared resources and data to PCs and other devices.

South Africa’s 4IR (fourth industrial revolution) centres, which are designed to train master trainers to develop peers, are piloting 21st century skills including cybersecurity in an effort to modernize the TVET system. **Türkiye**’s Education Informatics Network (EBA), an online resource archive for education, expanded efforts to protect systems from cyber-attacks originating from abroad. Security policies applied to foreign traffic aim to ensure the continuity of the DDOS security service and of the live lesson application, which allows interactive lessons by eliminating the distance between teacher and student during distance education.

System-wide strategies

Many of the programmes mentioned above are part of larger, broader, system-wide strategies towards the digital transformation of education systems. For example, the Digital Education Action Plan (2021–2027) is a renewed **European Union** policy initiative to support the sustainable and effective adaptation of the education and training systems of EU Member States to the digital age.

In **Rwanda**, Enhanced use of ICT to transform teaching and learning and to support the improvement of quality across all levels of education in Rwanda is a holistic, ongoing programme that aims to equip primary, secondary, TVET and higher education institutions with smart classrooms, enhance teaching skills in ICT across all levels, and develop and implement digitalized content at all levels of education.

Spain’s Plan of Digitalization and Digital Competences of the Education System aims at supporting the digital transformation of the education system through four action lines. In Line 1, Digital Competence in Education, an estimated budget of €312.2 million will be allocated to improving the digital competence of students, to implementing the Framework for the Digital Competence of Teachers, to elaborating, implementing and evaluating at least 22,000 Digital School Plans, and to improving the digital competencies of around 700,000 teachers by means of in-service teacher training courses.

South Africa’s White Paper on e-Education targets the provision of internet connectivity for both administration and teaching and learning, ICT infrastructure for both students and classrooms, and teacher training on blended learning. It also aims to develop the Framework on Digital Learning and the Framework on Regulation of Online Schools to guide the nation on establishment, registration and accreditation of schools that operate online.

3.7. Conclusion

Challenges in achieving universal quality education existed in G20 countries before the pandemic, as can be seen from the fact that in 2019, a significant share of young people failed to complete secondary education, with wide disparities within and between countries. The COVID-19 pandemic has made this crisis more acute, propelling education into turmoil. The G20 survey suggests that three kinds of policies and programmes have been used to confront these issues:

1. Developing education systems that give every child a good start and leave no one behind
2. Ensuring that TVET systems support individuals’ and economies’ adaptability and resilience
3. Expanding digital connectivity, capacities, tools and resources to enable education systems to leverage the transformational potential of digital technology.

In the next section, the report details the ways in which G20 education systems are preparing learners for the future of work, the fourth priority area of the G20 EdWG.

Table 9. Programmes focusing on digital technology

ARGENTINA

Title: CONECTAR IGUALDAD

Beneficiary group/s: Teachers, principals

Implementer: Ministry of Education (primary responsibility), 24 jurisdictional ministries of education

Short description: This programme is a federal digital inclusion policy that includes the distribution of educational and technological material and the deployment of connectivity actions. The programme seeks to reduce digital, educational and social gaps throughout the country. The programme distributes computers for all students to state-managed educational establishments. It also provides a digital platform with open educational resources, created collaboratively by all the country's jurisdictions, and a system of virtual classrooms for teachers to prepare their classes online.

Partnership/Collaboration: n/a

Digital technology: A platform for loading and validating school enrolment was developed, to be used by members of the educational system. A virtual classroom system is provided for teachers to prepare their classes.

BRAZIL

Title: Laboratory of Creativity and Innovation for Basic Education (LABCRIE)

Beneficiary group/s: Teachers, principals

Implementer: Federal University of Mato Grosso do Sul, State Departments of Education, Department of Education of the Federal District

Short description: The programme promotes the development of new pedagogies to effectively utilize technologies in order to meet the demands of the current educational context. The main focus is on building the capacity of teachers and education managers through a variety of modalities, including collective construction, experimentation, sharing materials, self- and peer-assessment strategies and others.

Partnership/Collaboration: The programme collaborates with Federal Universities to transfer resources.

Digital technology: The programme leverages a variety of methods to embrace digital culture and digital skills for professional engagement and practice, such as active methodologies, maker culture, computational thinking and robotics.

CANADA

Title: Postsecondary Virtual Learning Strategy, Province of Ontario

Beneficiary group/s: Students, teachers, publicly funded PSE institutions, those of low socio-economic status, those in rural areas, linguistic minorities, Indigenous communities

Implementer: n/a

Short description: In December 2020, Ontario launched its inaugural Virtual Learning Strategy (VLS) to support the needs of Ontario's post-secondary institutions, learners and educators. This initiative works to improve access to high-quality virtual postsecondary education and retraining opportunities that are market-responsive and globally competitive.

Partnership/Collaboration: The VLS builds on and leverages Ontario's existing digital learning organizations, Contact North (CN) and eCampusOntario (eCO), which improve access and drive innovation in virtual teaching and learning. Both organizations are involved in the administration and implementation of the VLS; however, eCampusOntario has borne the largest financial and administrative responsibility.

Digital technology: Essential. Virtual learning has the potential to allow all Ontarians to pursue post-secondary education and training, career preparation or upskilling for labour market re-entry, regardless of their ability to travel to urban centres. The programme supports the development of digital content, distribution and platforms across publicly funded post-secondary education institutions, and a technology sandbox where digital applications can be piloted by sector partners.

CANADA

Title: Digital Action Plan for Education and Higher Education (Province of Quebec)

Beneficiary group/s: Young people and adults

Implementer: Ministry of Higher Education of Quebec

Short description: This plan covers the period from 2018 to 2023 and is based on 'the effective integration and optimal use of digital technologies to foster the success of all Quebecers in order to promote lifelong skills development and maintenance'. The Digital Action Plan focuses on supporting the development of the digital skills of young people and adults, using digital technologies to enhance teaching and learning practices, and creating an environment conducive to the development of digital technologies in the education system.

Partnership/Collaboration: n/a

Digital technology: Essential.

CHINA

Title: Vigorously Promote the Co-construction and Sharing of Digital Educational Resources, Enlarging the Coverage of Quality Education Resources

Beneficiary group/s: Students, teachers

Implementer: Ministry of Education

Short description: The objective of the programme is to continuously elevate the equality, inclusiveness and convenience of educational resources by promoting the co-construction and sharing of digital educational resources and enlarging the coverage of quality education resources. Through the construction of the National Public Service Platform and its connectivity to relevant platforms at the provincial and municipal level, over 50 million quality online education resources are available to a wide range of primary and middle schools, especially those in economically disadvantaged areas.

Partnership/Collaboration: The Ministry of Education cooperates with provincial and municipal levels to deliver this programme.

Digital technology: Essential. Digital technology plays an indispensable role as the programme is about the co-construction and development of digital educational platforms and sharing of digital resources. The program involves the establishment and utilization of the National Public Service Platform for Educational Resources.

EUROPEAN UNION

Title: Digital Education Action Plan (DEAP)

Beneficiary group/s: Girls/ women, those of low socio-economic status

Implementer: European Commission, in its Digital Education unit within the Directorate-General for Education, Youth, Sport and Culture (DG EAC)

Short description: To support the digital transition, the European Commission proposed a new comprehensive approach to digital learning and education under the Digital Education Action Plan 2021–2027 adopted in September 2020. This key element of the EEA has been devised to ensure that every citizen is equipped with the digital competences and skills to work, learn and realize their full potential in the digital era. The Digital Education Action Plan puts digital education firmly at the centre of the education landscape in Europe through focusing on two strategic priorities: promoting the development of a European digital education ecosystem, and enhancing digital competences and skills.

Partnership/Collaboration: The DEAP is shaped by a Structured Dialogue, including different sectors and institutions of government, such as education and training institutions, infrastructure providers, the private sector and civil society organizations. The DEAP outlines five main pillars for the partners to focus on: impact-focused investment; the place of digital competences in education and training systems; governance of digital education, training and skills policies; the role of industry, social partners and other stakeholders; and the content of digital competence frameworks.

Digital technology: Essential. Digital technology is central to the rationale of the DEAP. The plan will focus on the ways in which education institutions have access to technology (networks and equipment) as well as the ways they can integrate use of technological solutions – including artificial intelligence – into teaching itself. It focuses on the way that applications can themselves be applied or adapted to meet the learning and teaching needs of education institutions and of individual learners. This is the central thrust of the programme: both using tools and upskilling learners and teachers at all levels to use them.

FRANCE

Title: National Accelerating Strategy for Education and Digital Technology

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff, girls/women, those of low socio-economic status, those in rural areas

Implementer: Ministry of Education and Youth (DGESCO and Direction du numérique pour l'éducation, DNE, *Directorate-General for Digital Education*)

Short description: Under this strategy, every pupil, student, teacher, employee and citizen must be trained in basic skills and digital culture so that they can use the internet in a controlled and responsible manner and, more generally, can contribute to digital citizenship as promoted by France and Europe.

Partnership/Collaboration: This programme leverages a public–private partnership in between French authorities (education and higher education ministries) and the EdTech France association, which brings together French companies that have decided to make technology and innovation useful to education, higher education and lifelong learning.

Digital technology: Essential.

GERMANY

Title: Innovation Competition INVITE – The development of innovative solutions that enable people to find the right continuing professional training on demand

Beneficiary group/s: Teachers, all people seeking continuing education and training, those of low socio-economic status, low qualified people

Implementer: Federal Ministry of Education and Research (BMBF)

Short description: The Innovation Competition INVITE aims at the development of innovative solutions that, with the help of AI, enable all people to find the right continuing professional training on demand. INVITE funding in three development fields is directed at enabling and realizing connection and interoperability of platforms, stronger user orientation regarding platforms and the use of AI technologies for individualized design of learning processes. In addition, a meta project aims to identify standards for the design of an innovative digital ecosystem for continuing education and training.

Partnership/Collaboration: INVITE primarily seeks partnerships between stakeholders in digital education and continuing education and training platforms in order to build an inclusive digital platform ecosystem. The Federal Ministry of Research and Education is in charge of INVITE. The Ministry is supported by the Federal Institute for Vocational Education and Training (BIBB) in implementing the competition. BIBB is a federal institution with legal capacity under public law and an institution for researching and developing initial and continuing vocational education and training.

Digital technology: Essential. Digital technologies play a central role in the INVITE competition. The main focus is on platform integration and interoperability, including the use or integration of external data sources. Some projects focus on the optimization of known learning management systems, so that, for example, AI-based individual learning paths become possible or machine data can be processed. Another focus is on the topics of identities and certificates and the associated topic of blockchain. This relates to the creation of different types of user profiles and the potential to permanently store and verify digital certificates. And finally, serious games play a central role in the development of AI-supported teaching and learning offers in the competition.

GERMANY

Title: ‘DigitalPakt Schule’ – A joint programme of the federal government and the Länder to improve digital infrastructure in schools.

Beneficiary group/s: Students, teachers

Implementer: Federal government, Governments at Länder level

Short description: The federal government and the Länder launched the programme DigitalPakt Schule 2019–2024 to improve digital infrastructure at schools across Germany. The federal government supports the Länder and municipalities in investing in IT equipment and systems and in bringing schools online in order to create a digital education infrastructure that is fit for the future.

Partnership/Collaboration: A joint steering group of the federal government and the Länder at the level of State Secretaries and State Counsellors oversees programme planning and management, while implementation of the programme is carried out by the Länder.

Digital technology: Essential.

INDIA

Title: National Digital Education Architecture (NDEAR)

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff

Implementer: Central Board of Secondary Education (CBSE), National Council of Educational Research and Training (NCERT), Department of School Education and Literacy (DoSEL), States/Union Territories (UTs), Civil Society Organizations (CSOs)

Short description: NDEAR is an architectural blueprint for India's educational ecosystem that defines a set of principles, standards and specifications, guidelines and policies to strengthen the digital infrastructure for education. NDEAR will provide a diverse education ecosystem architecture for the development of digital infrastructure. It also ensures data empowerment and the protection of individual privacy and confidentiality, strictly adhering to India's data protection bill and laws.

Partnership/Collaboration: The project involves all states/ Union Territories (UTs), tech partners, autonomous bodies of the Ministry of Education and CSOs. As per National Education Policy (NEP) 2020, public-private partnerships (PPPs) are encouraged.

Digital technology: Essential. Existing applications need to be revamped to make them NDEAR-compliant, while newly created applications must adopt NDEAR architectural standards. A detailed report is available at NDEAR Blueprint: <https://www.ndear.gov.in/>.

INDIA

Title: National Mission on Education through Information Communication Technology (NMEICT)

Beneficiary group/s: Students, teachers, girls/women; those of low socio-economic status, rural those in areas, linguistic minorities

Implementer: Ministry of Education

Short description: NMEICT has been envisaged to leverage the potential of ICT in providing high-quality personalized and interactive knowledge modules over the internet/intranet for all learners in higher education in anytime, anywhere mode. It is a major intervention in enhancing the quality of higher education by providing quality content to learners.

Partnership/Collaboration: The programme relies on partnerships among key stakeholders, including teachers, higher education institutions and non-governmental organizations involved in the development of course content, e-resource planning, aggregating and hosting, and delivery of lectures. The Indian Institute of Technology (IIT), Indian Institute of Management (IIM) and Central Universities are primarily involved in development of content for this programme.

Digital technology: Essential. Every project of the programme, namely SWAYAM MOOCs, SWAYAM Prabha, Virtual Labs, NDL, and e-Yantra, is completely digital in nature and uses state-of-the-art digital technology.

INDONESIA**Title:** School Digitalization**Beneficiary group/s:** Students, teachers, principals, university administrators, academics, local governments**Implementer:** Ministry of Education, Culture, Research and Technology

Short description: In 2019, the government launched the School Digitalization programme, which provides schools with access to technology to accelerate transformation and promote technology-based learning. This programme aims to optimize learning through more effective use of technology.

Partnership/Collaboration: Partnerships in the School Digitalization programme are realized through the involvement of cross-ministerial roles as well as the private/edutech sector. The Ministry of Communication and Information Technology (Kominfo), for example, participates in providing internet access in disadvantaged areas through the Kominfo BAKTI Programme, while the private sector collaborates in activities such as providing tools or developing an ICT-based school management system.

Digital technology: Essential. Digital technology is the foundation for the programme's launch, and technology in learning activities is an important requirement because it can determine the effectiveness of teaching and learning.

ITALY**Title:** Educational and Organizational Digitalization of Schools: from the National Digital School Plan to the National Plan for Recovery and Resilience**Beneficiary group/s:** Students, teachers, school staff, all schools**Implementer:** Ministry of Education, with one activity conducted in collaboration with the Ministry of Economic Development

Short description: The programmes involve the transformation of school spaces from traditional classes into innovative learning environments, both physical and virtual, connected to the internet and integrated with digital technologies.

Partnership/Collaboration: n/a

Digital technology: Essential. The investment makes available the most innovative digital technologies for teaching (coding and devices for robotics, for virtual reality, for inclusive education, etc.) to be used in teaching at least 100,000 primary and secondary school classes.

ITALY**Title:** Investment aimed at the creation of an integrated in-presence and digital teaching and learning system and the training of school staff and students on the digital transition development**Beneficiary group/s:** Students, teachers, parents/caregivers, school staff**Implementer:** n/a

Short description: The integrated system for the enhancement of the digital skills of students includes the implementation of digital skills curricula in every grade of school, the design of digital platforms for the development of teachers' and students' digital skills, the activation of specific measures to promote the digital inclusion of all students, and the implementation of innovative teaching methodologies.

Partnership/Collaboration: The investment provides for the creation of a Pact for Digital Education and Skills of the Future. Through this pact, schools become territorial focal points for the development of intergenerational training courses for teachers, students and adults, including through the active participation of local authorities, businesses and associations. The main responsibility for the programme lies with the Ministry of Education.

Digital technology: Essential. One of the key initiatives of the investment is the creation of a platform for digital education content and innovative teaching methods that can be used by teachers, students and families.

JAPAN

Title: Large-scale financial support for improving environment for distance learning at universities

Beneficiary group/s: Students, teachers, school staff

Implementer: n/a

Short description: This programme aims to accelerate and strengthen the development of distance learning opportunities at universities. This includes improving system and server maintenance related to remote lesson implementation, equipment maintenance for distance learning (e.g., cameras, audio equipment, mobile routers to lend to students), and supporting expenses necessary for establishing a technical and educational support system for conducting distance lessons.

Partnership/Collaboration: n/a

Digital technology: Digital technology is used for establishing facilities and systems that enable remote lessons (remote interactive business and on-demand lessons) and building an environment where students are able to easily take lessons at home without any problems.

MEXICO

Title: Aprende en Casa

Beneficiary group/s: Students, teachers, parents/caregivers, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds

Implementer: Secretaría de Educación Pública/Subsecretaría de Educación Básica (*Secretary of Public Education/Subsecretary of Basic Education*)

Short description: Aprende en Casa is a national strategy of distance learning, which aims to provide basic educational services through different media such as television, internet and radio and through providing free textbooks to children and adolescents to guarantee their right to education, even in emergency contexts, such as during the COVID-19 pandemic.

Partnership/Collaboration: Responsibility for delivery of the programme lies with the Secretaría de Educación Pública and Subsecretaría de Educación Básica, who partner with broadcasters such as Canal 11 and Instituto Mexicana de la Radio to reach learners through TV, internet and radio.

Digital technology: Essential. To meet the objectives of the study plans and programmes, the programme used Google for Education (GFE) as well as online texts and exercises, in addition to viewing the Aprende en Casa programmes and the delivery of virtual classes.

MEXICO

Title: National Information System for Upper Secondary Education (SEEMS)

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds

Implementer: Vice Ministry of Upper Secondary Education

Short description: The Statistical System of Upper Secondary Education (SEEMS) will strengthen the ability of the state, regional and national levels to monitor and ensure the universal coverage of inclusive and equitable education in all regions of the country. SEEMS will allow the integration of information that describes the coverage of educational services and infrastructure, as well as the budgetary needs and priorities of each state.

Partnership/Collaboration: SEEMS is part of a coordination strategy between the federation and the states. This joint work forms a national planning agreement that allows the competent authorities to access information from states about upper secondary education in the country and its budgetary requirements.

Digital technology: Essential. An ad hoc platform has been developed to house the system. Digital tools are also used for inter-institutional management and communication, since it is a priority to establish and maintain permanent contact with the education authorities at federal and state levels throughout the country. The operation of the platform requires the training of users who will be, on the one hand, the directors of the educational establishments responsible for uploading the information to the system and, on the other hand, the educational authorities who will be able to consult the information to support planning and operations.

UNITED STATES

Title: CTE CyberNet – including local STEM education ecosystems

Beneficiary group/s: Teachers, local education ecosystems

Implementer: Department of Education, managed by a contract to Luminary Labs, LLC in New York, New York

Short description: CTE CyberNet is a network of teacher professional development intensive academies led by two-year and four-year postsecondary institutions designated by the National Security Agency (NSA) as Centers of Academic Excellence (CAE). The CTE CyberNet was strategically designed as an education ecosystem development initiative to develop the cybersecurity skills of high school teachers and create a community support structure, or local ecosystem, to increase the persistence and sustainability of the academies. The programme is currently active in five communities, each of which serves at least 10 teachers. Two CTE CyberNet sites are currently piloting a ‘hub-and-spoke’ model to expand the reach from a local to regional or multi-state model.

Partnership/Collaboration: The CTE CyberNet is intended to leverage local STEM education ecosystems at and across the academy implementation sites. The local education ecosystems consist of multi-sector partners united by a collective vision of supporting participation in cybersecurity through the creation of accessible, inclusive learning opportunities spanning all education stages and career pathways. The CTE CyberNet was supported nationally by private sector companies such as Microsoft, Offensive Security (Kali Linux) and MasterCard; local chambers of commerce and industry associations; and local employers, all of which contributed to the development and sustainability of the local ecosystems. The education ecosystem continuously evaluates its activities, adapts as needed, plans for the long term and communicates its work to build broad support and advance best practices.

Digital technology: Essential. Technology used in the academies and classroom instruction include specialized operating systems such as Kali Linux, state and local cyber ranges, and learning management systems, such as Canvas. CAE institutions leading each CTE CyberNet site also use a variety of hardware and software platforms in the professional development and implementation environments, as well as video conferencing applications such as Zoom and Microsoft Teams.

REPUBLIC OF KOREA

Title: Establishment of Integrated Digital Platform for Teaching and Learning

Beneficiary group/s: Students, teachers, parents/caregivers

Implementer: Ministry of Education, provincial offices of education

Short description: By combining private and public edutech services in an integrated platform, various teaching and learning services and self-directed customized learning environments are provided to users.

Partnership/Collaboration: The Ministry of Education is working with private and public edutech companies and provincial education authorities to develop this platform.

Digital technology: Essential. Digital technology is used to provide customized learning support and hybrid cloud-based infrastructure using AI, big data and cloud technologies.

REPUBLIC OF KOREA

Title: The Knowledge Spring

Beneficiary group/s: Teachers

Implementer: Ministry of Education, KERIS (Korea Education and Research Information Service)

Short description: The programme strengthens and builds teacher capacity of teachers in remote teaching and edutech competency through real-time video conferencing between teachers.

Partnership/Collaboration: Edutech companies participate in the training development to introduce global trends and new products in relevant fields to support capacity building.

Digital technology: Essential. Digital edutech technologies such as real-time imaging systems and LMS are used in conducting remote classes and educational activities.

RUSSIAN FEDERATION

Title: Superservice: Online University Admission

Beneficiary group/s: Students, teachers, parents/caregivers

Implementer: Ministry of Science and Higher Education, with the Ministry of Digital Development, Communications and Mass Media and the Federal Service for the Supervision of Education and Science

Short description: The programme allows students to apply for admission to higher education institutions in electronic format, including through the federal state information system Single Portal of State and Municipal Services (functions) (EPGSU). The Superservice provides a platform that organizes information and enables technological interaction between higher education institutes and the federal information system to ensure the state final certification of students who have mastered the basic educational programmes of basic general and secondary general education. The Superservice provides an opportunity to submit documents for admission to organizations (except for original documents on education and/or qualifications) remotely for all categories for the period from 2020 to 2024.

Partnership/Collaboration: n/a

Digital technology: Essential. Enrollment takes place through a set of information systems.

RWANDA

Title: Enhanced use of ICT to transform teaching and learning and to support the improvement of quality across all levels of education in Rwanda

Beneficiary group/s: Students, teachers, principals, parents/caregivers, with priority target group/s of girls/women, those in rural areas

Implementer: Ministry of Education, Ministry of ICT and Innovation, Rwanda Basic Education Board, Rwanda TVET Board, University of Rwanda

Short description: This is an ongoing programme, stipulated in Rwanda's ICT in Education Policy. The goal is to equip primary, secondary, TVET and higher education institutions with smart classrooms, enhance teaching skills in ICT across all levels, and develop and use digitalized content for all levels of education.

Partnership/Collaboration: The programme is carried out with the support of the World Bank and USAID.

Digital technology: Essential. All initiatives under this programme require internet connectivity and ICT devices.

SAUDI ARABIA

Title: Education data management

Beneficiary group/s: Students, teachers, everyone in Saudi Arabia

Implementer: Ministry of Education

Short description: Develop and operate a standard educational data management system for all levels. This initiative aims to set criteria for data mapping and sharing, and work with different educational institutions to link them to the system.

Partnership/Collaboration: n/a

Digital technology: Essential. Technology is used to intensify innovative learning methods and leverage flexible learning options and technology-based learning solutions.

SAUDI ARABIA

Title: Madrasati (Learning Management system)

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff, administration staff at administration districts and administrative offices, ministry leadership, girls/women, those of low socioeconomic status, those in rural areas, those from migrant backgrounds

Implementer: Ministry of Education

Short description: Madrasati ('my school' in English) is the national e-learning management platform. It is connected with the national students' information system (SIS), dashboard and digital content repository and provides three e-learning models: blended, synchronous and asynchronous; distance learning; and face-to-face technology-enhanced learning. Madrasati aims to enhance learning and skill acquisition to ensure digital content utilization. It enhances learning outcomes in formal subjects including sciences, mathematics, languages, Islamic studies, digital skills, art, social studies and life skills.

Partnership/Collaboration: The Ministry of Education built on previous investments in e-learning and digital content based on its collaboration and engagement with private sector organizations such as Microsoft, T4edu (Tatweer Company for Educational Services) and TETCO (Tatweer for Educational Technologies) to transform the curriculum into a digital and interactive format with a user-friendly interface. Telecommunications companies and the Ministry of Communications and Information Technology provided equipment, infrastructure and free or subsidized access to low-income families and education partners to ensure that learners and stakeholders had consistent access to the digital platform. The National eLearning Center (NELC) worked closely with the Ministry of Education and played an important role in designing an evaluation framework for e-learning and distance learning.

Digital technology: Essential. Madrasati works as a comprehensive E-learning Management System and is linked with the national students' information system, Noor, as well as with digital content aligned with learning goals and performance-monitoring dashboards. It provides multiple educational tools to support synchronous and asynchronous planning and implementation of educational processes. Madrasati is equipped with educational tools that promote a complete interactive educational journey to ensure quality education and 21st-century skills acquisition, such as: scheduling, learning objectives, virtual classrooms, an enrichment resources bank, e-courses, learning paths, digital content and an e-learning dashboard. These tools are supported with practical guides and rich educational digital content that is scientifically grounded.

SOUTH AFRICA

Title: National Open Learning System (NOLS)

Beneficiary group/s: Students, teachers, principals, girls/women, those of low socio-economic status, those in rural areas

Implementer: Department of Higher Education and Training (DHET)

Short description: The Department of Higher Education and Training has adopted open learning as a strategy to increase access to education and training opportunities and to construct quality learning environments which take account of students' contexts and use the most appropriate and cost-effective methods and ICT. The national open learning management system aims to provide students in PSET with efficient, relevant and viable open learning; progressively harness open learning principles in all PSET institutions; utilize ICT as an enabler for teaching and learning; and make high-quality, shared teaching and learning resources increasingly available as Open Educational Resources (OER).

Partnership/Collaboration: Developing and hosting digital content is a time-consuming and expensive process. However, through collaboration with PSET institutions, experts and industry entities and associations/formations, DHET is developing learning opportunities with high-quality open learning materials that are made available as OER on the NOLS.

Digital technology: Essential. The use of ICT, including digital and technological solutions in education and training, have been up-fronted and fast-tracked to ensure education and training continuity in the context of the COVID-19 pandemic.

SOUTH AFRICA

Title: South African Research and Education Network (SANReN) Connectivity (including the TVET College Connectivity Project, TCCP) for universities and TVET Colleges

Beneficiary group/s: Students, principals, lecturers, those of low socio-economic status, those in rural areas

Implementer: Department of Higher Education and Training (DHET)

Short description: The SANReN was established to provide universities and other education institutes with access to the internet. To date, all 26 public universities and their campuses (to a total of 350 sites and offices) across all 9 provinces have access to broadband connectivity. All TVET Colleges' campuses (despite most of them being in rural locations) are currently connected to the SANReN through the TVET College Connectivity Project (TCCP) funded by the National Skills Fund (NSF) since August 2017. All TVET Colleges' campuses also receive the same high speed, high quality and excess bandwidth.

Partnership/Collaboration: The initiative is implemented through collaboration between the Department of Science and Innovation (DSI), the Council for Scientific and Industrial Research (CSIR) and the Department of Higher Education and Training (DHET). Non-state actors involved in the programme include TENET and network operators.

Digital technology: Essential. DHET has adopted open learning as a strategy to increase access to education and training opportunities and use the most appropriate and cost-effective methods, including ICT. Furthermore, the use of ICT, including digital and technological solutions in education and training, have been up-fronted and fast-tracked to ensure education and training continuity in the context of the COVID-19 pandemic.

SPAIN

Title: Plan for Digitalization and Digital Competences of the Education System (#DIGEDU)

Beneficiary group/s: Students, teachers, principals, school staff

Implementer: Ministry of Education and Vocational Training

Short description: The plan aims to reduce the digital divide in use, access and didactic education. For instance, the plan will: improve the digital competence of the educational community; broaden access to the digital media necessary for a quality education that responds to current employment and social needs; encourage education with digital media by facilitating the creation of digital OER; and promote a competitive and modern society through advanced digital methodologies and competences.

Partnership/Collaboration: n/a

Digital technology: Essential. The programme leverages several digital technology initiatives, such as: a) the European Commission's SELFIE tool, b) the Spanish Common Digital Competence Framework for Teachers, c) the School Digital Plan, which provides 300,000 mobile devices for the students who need them most, added to the almost 500,000 already distributed as part of the Educa en Digital programme, and d) the installation of some 240,000 interactive digital classrooms for the development of a blended learning system.

TÜRKİYE

Title: Digital Special Education Project

Beneficiary group/s: Students, teachers, principals, parents/caregivers

Implementer: Ministry of Education

Short description: The general purpose of the Digital Special Education project is to improve the quality of special education services offered to children with disabilities. The project, which started in September 2021 within the scope of the Ministry of Education-UNICEF Education Work Plan, aims to create innovative learning environments in order to meet learning needs (both in face-to-face and blended education environments) and maintain learners' well-being. The project supports learning recovery, normalization and counselling and guidance for learners and their families during education disruptions (such as COVID-19 or other natural disasters). The project is developing systemic and school-based web-based learning/teaching tools needed for children with disabilities to access quality education.

Partnership/Collaboration: The project carried out stakeholder consultations with non-governmental organizations involved in the education of individuals with special educational needs, including: Dyslexia Association, Foundation for the Education and Protection of Mentally Handicapped Children (ZİÇEV), Association of Children with Cerebral Palsy (SERÇEV), All Special Education and Rehabilitation Institutions Association, and the Autonomous Federation of Mentally Handicapped.

Digital technology: Essential. The main element of the project, which is structured within the scope of digital transformation in special education, is digital-based tools. The main activities of the project involve the development of digital applications, and all materials developed will be open to national access through an interactive platform. For this purpose, teachers, one of the target audiences of the project, will be trained on how to use digital tools in preparing course content, and awareness-raising activities will be organized for parents on how to use ICT tools to guide their children in order to support learning at home.

TÜRKİYE

Title: Education Informatics Network (EBA)

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff

Implementer: Ministry of National Education

Short description: The network complements face-to-face education by offering an online digital education platform to all students, teachers and parents. Education Informatics Network (EBA) has more than 1,900 recorded lessons taught in schools and more than 60,000 items of rich, reliable and interactive content. In addition to textbooks, interactive books, applications and tests at each grade level, types of content in the platform include video and interactive lectures, exercises, summaries, infographics, project documents and teacher-specific content.

Partnership/Collaboration: n/a

Digital technology: Essential. The EBA is constantly updated in terms of both features and infrastructure, according to innovations in technology, demand intensity and user suggestions. During the online learning period caused by the COVID-19 pandemic, capacity building activities were accelerated within the contribution of the Türkiye Safe Schooling and Distance Education (SSDE) Project. In this context, the number of data centres have been increased, new hardware has been integrated into the system, data centre and CDN internet bandwidth have been increased, and database, performance and architectural improvements have been carried out.

UNITED ARAB EMIRATES

Title: Digital technologies in education: Promote e-maturity framework and spread the adoption of utilizing fully integrated smart learning ecosystems such as the one developed by MBRSLP

Beneficiary group/s: Students, teachers, girls/women, those of low socio-economic status, those in rural areas

Implementer: Ministry of Education schools, Mohammed Bin Rashid Smart Learning Programme (MBRSLP) and private schools

Short description: The United Arab Emirates has developed a fully functional holistic and integrated digital ecosystem in the Emirati school model which promotes unified and continuous learning from early years to higher education. The Digital School is an initiative by Mohammed Bin Rashid Al Maktoum Global Initiatives (MBRGI) that is a proven model providing certified online education to students who do not have easy access to formal education. The school blends live and self-paced virtual classes in math, science, Arabic, computer studies and English, targeting young people in refugee camps and marginalized communities, irrespective of their social, economic and educational backgrounds. The Madrasa program is another model of a free e-learning experience: it provides 5,000 free videos in general science, math, biology, chemistry and physics, as well as 11 million words of educational content, to students from kindergarten to grade 12 and is accessible online to over 50 million Arab students around the world.

Partnership/Collaboration: The Ministry of Education partners with national and international leading education providers to deliver this programme. National universities and private and public entities in business, economics, science, STEM, AI and space are keen partners in improving and enhancing the educational experience. Non-state actors engaged in the programme include national and international educational institutions such as College Board, NGSS, Microsoft, Pearson, McGraw Hill, Al Ain university, Khalifa university, Zayed University and many other local and private organizations.

Digital technology: Essential. The programme is based on digital platforms and learning management systems, and its success depends on not only on device and connectivity availability but on the guidance and support of trained teachers. The programme involves continuous improvement of digital technological developments such as the metaverse, AI, virtual reality and so on to enable students to have the latest digital learning experience. The programme requires students and teachers to have basic technology devices such laptops or mobile phones and internet connectivity.

UNITED KINGDOM (ENGLAND)

Title: Digital Inclusion Strategy

Beneficiary group/s: Students, teachers, parents/caregivers, those of low socio-economic status

Implementer: Department for Education

Short description: The strategy provided a wide range of resources to support schools and further education institutions and ensure learners have the best opportunities to access education remotely. For example, the [Get Help with Remote Education](#) on gov.uk provided a support package for teachers and school leaders, which includes: a [self-assessment framework](#) to support schools and further education institutions; help to access technology that supports remote education; peer-to-peer training and guidance on how to use technology effectively; and resources and school-led webinars to support effective delivery of the curriculum. In addition, the strategy supported the rollout of an additional 500,000 devices for disadvantaged children and young people. This builds on the 1.35 million laptops and tablets already delivered to schools, trusts, local authorities and further education providers during the pandemic. Lastly, the government is providing funding to support schools and further education institutions in providing internet access for disadvantaged pupils whose face-to-face education has been disrupted, including providing 4G wireless routers for pupils and students without internet access.

Partnership/Collaboration: n/a

Digital technology: Essential. Technology has played an essential role in education through the COVID-19 pandemic. Teachers and leaders are rapidly embracing technology as an important tool for education and running education institutions. Longer-term, good use of technology can play a role in improving education by supporting reduced teacher workload, improving pupil access and outcomes and making school administration more efficient and less burdensome. The Department for Education is supporting schools and colleges with the infrastructure and capability they need to best take advantage of the opportunities in technology through the new digital strategy for education.

4.

Getting Ready for Future of Work: Transforming Education Systems

In modern societies and economies, the demand for skills is constantly evolving. Rapid change and emerging challenges have made uncertainty the norm, as the COVID-19 pandemic has demonstrated. Labour markets worldwide are undergoing technological change, driven by the expansion of artificial intelligence (AI), automation and the fifth generation of mobile communication technology (5G), all of which will destroy and create jobs on a massive scale, exacerbating the existing polarization of the labour market. These technologies are transforming the workplace, reducing the need for human intervention in many work processes, and simultaneously creating a demand for lifelong learning as people attempt to adapt. Meanwhile, the digital transformation is challenging formal employment and the associated worker benefits, as demonstrated by the growth of the gig economy.

At the same time, the reality of the climate crisis is generating an increasing demand for green sectors and skills. Climate change is pushing industries that have a detrimental impact on the environment towards obsolescence and driving innovation in agricultural production. Skills development and support will be needed for all: those who are formally employed, those in the informal economy, self-employed people and workers in non-standard forms of employment. Current workers can expect to retrain and upskill multiple times throughout their lives, making lifelong learning a priority.

The informal economy remains extensive around the world, particularly in developing countries. Informality makes up 61 per cent of total global employment (including agriculture), 68 per cent of employment in Asia and the Pacific and in the Arab States, and up to 86 per cent of employment in sub-Saharan Africa (ILO, 2018). Informal employment can no longer be considered to be a feature of a ‘traditional’ sector that will inevitably be replaced with a ‘modern’ sector as economic development progresses. Innovative approaches are needed to help

extend skills development and social protection to informal workers, and new systems must be created to recognize and validate learning that takes place across informal settings.

This chapter will examine the readiness of G20 countries’ education systems to contribute to the future of work. Its aim is to understand how different countries are transforming their education systems to prepare their learners to tackle the challenges and build on the opportunities that arise from current trends and transitions.

First, the chapter will provide a framework for the concept of ‘future of work’. Then, it will discuss the implications of this concept for the future-readiness of education systems. To do so, it will assess the ways in which G20 countries’ policy orientations and interventions are preparing their education systems, through evolving pedagogies, adapting curricula, transforming the role of teachers and schools, and creating new learning spaces.

4.1. The future of work: A conceptual framework

To assess how ready education systems are for the future, a common understanding is needed of what the ‘future of work’ entails. The future of work affects many different aspects of current societies and economies, and will have significant consequences for education systems and beyond. Moreover, it may take different forms in different places, depending on countries’ socio-economic development, on the specific economic sector in question, and even potentially on the size of the company involved.

While there are multiple ways of framing this concept, the vision adopted in this chapter is based on the prescriptions from the International Labour Organization’s Global Commission on the Future of Work report. ILO’s Global Commission promotes a human-centred future of work.

This vision makes investment in human capacities and decent work central in socio-economic policymaking and business practice debates and prescribes a set of actions that need to be taken to move along this trajectory.

ILO's future of work agenda encompasses three pillars of action, which, in combination, are expected to create synergies and induce growth, equity and sustainability for present and future generations. They include a set of actions and sub-actions towards the development of individuals' skills and capabilities within a lifelong learning perspective, the creation of better work institutions and, finally, the promotion of sustainability. These pillars are as follows¹⁴:

1. Increasing investment in people's capabilities

- a.** A universal entitlement to lifelong learning that enables people to acquire skills and to reskill and upskill
- b.** Stepping up investments in the institutions, policies and strategies that will support people through future of work transitions
- c.** Implementing a transformative and measurable agenda for gender equality
- d.** Providing universal social protection from birth to old age

2. Increasing investment in the institutions of work

- a.** Establishing a Universal Labour Guarantee
- b.** Expanding time sovereignty
- c.** Ensuring collective representation of workers and employers through social dialogue as a public good, actively promoted through public policies
- d.** Harnessing and managing technology for decent work

3. Increasing investment in decent and sustainable work

- a.** Incentives to promote investments in key areas for decent and sustainable work
- b.** Reshaping business incentive structures for longer-term investment approaches and exploring supplementary indicators of human development and well-being.

4.2. The future-readiness of education systems

Knowledge and learning are the building blocks of renewal and transformation. Understanding and anticipating the future of work requires activating several adaptation mechanisms in education systems worldwide, starting immediately. Education and training, within a lifelong learning perspective, have a crucial role to play in supporting the full set of actions and sub-actions prescribed by ILO in its future of work framework.

A recent report, published as part of UNESCO's Futures of Education initiative, reflects on the future roles of education worldwide.¹⁵ The report analyses possible futures for the education sector, ranging from radical transformation to profound crisis. It then proposes a new social contract for education, grounded in human rights and based on the principles of non-discrimination, social justice, respect for life, human dignity and cultural diversity. The new contract should reinforce education's role as a public endeavour and common good. It requires action on five interconnected pillars, representing the key domains of interventions around which modern education systems will have to be reconfigured in order to be future-ready: (1) pedagogies, (2) curricula, (3) teachers, (4) schools and (5) learning spaces.

One key component of the education response to the future of work must be providing skills that are much in demand to meet fast-changing labour market needs. However, this cannot be the only solution. Curriculum adaptation must be accompanied by complementary interventions aimed at preparing and upgrading the other building blocks of modern education systems. Teachers will have to upgrade their role as knowledge producers and key figures in promoting educational and social transformation. Eventually, they will need to change the way they interface with students and perform their traditional tasks. Schools will evolve, becoming places for inclusion, equity and the promotion of individual and collective well-being, integrating new architectures, spaces and tools. Pedagogies will need to be restructured, making room for cooperation, collaboration and solidarity. People will increasingly benefit from learning opportunities that take place outside education institutions, in different cultural and social spaces, within a lifelong learning perspective. These changes in learning experiences and

¹⁴ ILO, 2019, *Work for a Brighter Future, Global Commission for the Future of Work*, Geneva, available at https://www.ilo.org/global/publications/books/WCMS_662410/lang--en/index.htm.

¹⁵ UNESCO – International Commission on the Futures of Education, 2021, *Reimagining our futures together: a new social contract for education*, available at <https://unesdoc.unesco.org/ark:/48223/pf0000379707>.

spaces will necessitate the introduction of new systems for skills recognition and validation.

Many countries have made progress on integrating the five pillars for the future of education (pedagogies, curricula, teachers, schools and learning spaces) into their reforms. Most G20 countries' recent policies and programmes indicate a shift away from traditional methods of teaching and learning toward increasingly digitally integrated models of schooling. These programmes tend to have some targets in common: the digital upskilling of teachers and youth; pedagogical reforms to support and prepare for blended and hybrid learning across all levels of education; expanding systems for data analytics and information management; and leveraging digital technology to support students with special needs, vulnerable students and girls. Many of these programmes position education systems as vehicles towards achieving cross-cutting governmental goals of building greener, safer, more inclusive and crisis-resilient futures.

In countries with wider and deeper digitalization of government sectors, recent programmes and policies related to technology in education are markedly future-oriented. They aim to prepare the education system for a digital decade in which advanced technologies and data systems will play a powerful role in decision-making in the education sector.

4.3. Changing pedagogies

The pedagogy pillar aims to ensure that cooperation, collaboration, solidarity and diversity are part of student preparation and workers' lives in all contexts. Policies towards the future of work should include teaching and instruction practices that use these principles to provide meaningful skills. These skills must be aligned to the local community and the needs of the labour market, as well as to global sustainable goals and human rights promotion. G20 countries have started to implement policies that cover pedagogies designed to promote the well-being and mental health of learners, while preparing them for the future of work (see Table 10).

For example, the Learning Recovery Action Plan in Ontario (**Canada**) aims to help students recover from the disruptions of the COVID-19 pandemic. The goal is to strengthen students' reading and mathematics skills, while at the same time improving their mental health and well-being. Similarly, **Mexico** has established a National Strategy to strengthen diagnostic evaluation, improve educational achievement and reduce school lag and dropout rates, with the intention of trying to address and

mitigate the academic damage done by the pandemic and to guarantee students' ability to exercise their right to education regardless of their origin or status. Among Mexico's priorities for the future of education is to ensure that all students acquire the theoretical and practical knowledge necessary to promote sustainable development, healthy lifestyles, human rights, gender equality, a culture of peace and non-violence and appreciate cultural diversity.

The Skills for Jobs initiative in England (the **United Kingdom**) will reform the skills sector by putting employers at the heart of reforms to tackle skills gaps, providing them with the talent they need to thrive. This will help to ensure more people can get the skills they need to get good jobs, wherever they live. The government aims, among other things, to promote children and young people's well-being and education recovery, partly through access to school holiday clubs, which are free to access for disadvantaged pupils and their families. England's Education Recovery plan also provides a mental well-being training module to help subject leads and teachers understand what to teach and to improve their confidence in delivering mental well-being education as part of new education curricula. In Scotland (the **United Kingdom**) the national e-learning offer complements the delivery of teaching and learning by bringing together both live and recorded resources for learners including online classes. The national learning platform, Glow, is a free to access platform for all learners and teachers in Scotland and is comprised of a range of online tools and services, including Microsoft 365 and Google Workspace which also support and enhance delivery of education. Access to these platforms proved to be invaluable throughout the period of remote learning.

Other initiatives focus on solidarity and inclusion, with specific interventions aimed at promoting access to education for disadvantaged groups. Some initiatives, like **Brazil**'s Professional Education for Green Economic Development and Employment, focus on specific groups. This plan seeks to improve the employability of graduates of professional education courses in sustainable sectors of the Brazilian economy, with a particular focus on youth, women and other vulnerable population groups. **Australia**'s Disability Standards for Education 2005 ensure that students with disabilities have the right to access education on the same basis as their peers. The Department of Education reviewed the Standards in 2020 and recognized the need to empower students with disabilities (and their parents and caregivers) by better informing them of their rights. The Department of Education is thus working with disability and education

community organizations and with education authorities to develop information products to help students, families and educators/providers to understand and deliver those rights and obligations. **Canada's** Support for Student Learning Program (SSL) funds critical programming to support learners, particularly students from Indigenous and other historically underserved communities, to complete high school and transition to and succeed in post-secondary education. And **India's** Rashtriya Uchchatar Shiksha Abhiyan (National Higher Education Mission, RUSA) programme boosts access and equity in higher education by providing adequate opportunities for quality higher education to students from Scheduled Castes (SCs) and Scheduled Tribes (STs), which have historically been socially and educationally disadvantaged communities. The programme also promotes the inclusion of women, transgender people and people with disabilities.

Other countries target broader population groups. **France's** National Recovery and Resilience Plan (NRRP), for example, provides support for students in their school career planning and aims to introduce greater social equity in access to higher education courses. **Italy's** Extraordinary Intervention Aimed at Reducing Territorial Gaps in Lower and Upper Secondary Schools tackles early school-leaving, with a strong inclusion perspective. The programme promotes continuous improvement of teaching and the personalization of learning, constant monitoring of students most exposed to the risk of early school-leaving, coordinated planning of interventions and continuous measurement of the effectiveness of actions taken. It also aims to create synergies with local communities and collaborate effectively with pupils' families towards improved learning and retention. **India's** Samagra Shiksha (Integrated Scheme for School Education) promotes the expansion of quality school education, aiming to promote equity through the inclusion of disadvantaged groups, while also improving the quality of education across all levels of school education.

In the wake of the pandemic, the **United States** attributes a strategic importance to education systems, workforce systems and business communities in promoting fairer and more equitable societies, in which everyone has a path to a middle-class life. To do so, it believes that it will be crucial to create strong through-lines in education systems from early learning to high school to post-secondary education and training, as well as to develop and expand partnerships between education systems and employers.

4.4. Adapting curricula and skills provision

The pillar of adapting curricula and skills provision involves defining and planning learning goals and learning rights, to better align them with demands from the labour market and to respond to future trends. These learning goals should reflect new curricular priorities, such as sensitivity to environmental and social issues, holistic understanding of the human being, and lifelong learning. Curricula should be much more than a collection of school subjects – they should also function to provide competencies at a broader level. Learners not only need to access knowledge; they must also understand how to further develop and create knowledge, while building their capacity to critique it and apply it.

Many countries have incorporated the development of 21st century skills and digital competencies into national curricula. To develop these competencies, the use of ICT must be integrated across curricula, so that students can learn to use ICT while learning with ICT. G20 countries are committed to ensuring that all citizens can develop the digital competencies required to participate in and contribute to society and the economy through wide-ranging policies that target the acquisition of digital skills.

Many G20 Member States are already working to renew their curricula and implement policies needed to support the population in the transition to the future of work. Most such interventions aim at identifying and anticipating skills gaps and updating curricula to fill them (see Table 10).

One of the **European Union's** strategic objectives is to design a responsive education and training system, incorporating the skills needed by the EU economy at all levels. Specific reference in the plan is made to competencies related to climate change, artificial intelligence and the digital transition. Similarly, England (the **United Kingdom**) aims to put employers at the heart of reforms to tackle skills gaps in order to provide better alignment between skills supply and demand, and **South Africa** is undertaking a multi-year, research project, exploiting Labour Market Intelligence (LMI) to promote a more responsive education system following a demand-driven approach to education and training.

Argentina's University Programme of Professional Education Schools aims, among other things, to broaden and strengthen the options for tertiary technical-professional education and for specific short-term technical training. The programme intends to equip young people with the key information they need to make

rational decisions about their labour market insertion. It also seeks to stimulate the development and/or consolidation of universities' institutional capacities in technical education. The goal is to increase tertiary education institutions' capacity to support labour market insertion, to identify the drivers of change in professional skills and to provide specific training responses.

In 2020, **Australia** established a National Skills Commission to deliver expert advice and national leadership on Australia's labour market and on its current, emerging and future workforce skills needs. The Australian government has also established the Job Trainer Fund, which subsidizes training opportunities for jobs in demand, encouraging job seekers looking to upskill to take up a range of accredited diplomas, certificates and short courses in areas such as health, aged and disability care, IT and trade. Finally, the Job-Ready Graduates package in the higher education sector is designed to lower student costs for enrolling in courses that provide qualifications and skills aligned with the demands of the Australian labour market.

France has introduced an accelerated review of diplomas every five years with the objective of reducing the gap between training courses and emerging occupations. Insertion data in each region are taken into account in the opening of new training sections, and local authorities are encouraged to be more agile in opening and closing training courses according to local economic and employment situations.

India, too, is prioritizing equipping young people with the competencies that are in demand in the world of work. Its strategy promotes the integration of vocational education into general academic education. In doing so, it plans to boost graduates' employability through a demand-driven competency-based approach, launch modular vocational courses, and bridge the divide between academic and applied learning. **Mexico** and **Saudi Arabia** are also overhauling their catalogue of training programmes and vocational certifications to adapt to future skills demands. Saudi Arabia has substantial emphasis in curricula development and building a strong foundation of 21st century skills. There are current efforts on reviewing and updating primary to secondary curriculum frameworks to provide more focus towards basic skills and build skills for the future. It also aims to introduce specialized tracks in general education for secondary school level. Moreover, the Human Capability Development Program has dedicated initiatives focusing on employability assessment of higher education degrees and technical and vocational training programs. The initiatives will focus on the review of the degrees and programs based on their

recent and expected employability results in line with future labor market needs.

One of the **United States'** Secretary of Education's six priorities is Increasing Postsecondary Education Access, Affordability, Completion and Post-Enrolment Success. Under this priority, which includes career and technical education, the Department of Education will support programmes that prepare students to succeed in the workforce, earn a competitive wage and pursue lifelong learning and career and economic advancement opportunities.

Other ad hoc initiatives designed and launched within this stream include **Brazil**'s Professional Education for Green Economic Development and Employment; **Canada's** Province of Manitoba's Skills, Talent and Knowledge Strategy and Province of Quebec's Digital Action Plan for Education and Higher Education and Digital Competency Framework; **China**'s School-Employer Supply-Demand Matching Program for Quality Employment; **France**'s National Accelerating Strategy for Education and Digital Technology; **Indonesia**'s Learning Transformation programme; **Italy**'s efforts to create an integrated and in-presence digital teaching and learning system; **Japan**'s Meister High School project; **Mexico**'s Common Curricular Framework for Upper Secondary Education and Dual Education in Upper Secondary Education; **Saudi Arabia**'s Study Plans and Curriculum Development Initiative and Curriculum revision and update to enhance basic and future skills; **South Africa**'s Three Stream Model; **Türkiye**'s Sectoral Centres of Excellence (SCoE); England's (the **United Kingdom**) Skills for Jobs: Lifelong Learning for Opportunity and Growth reforms; and the **European Union**'s European Education Area, Digital Education Action Plan and European Skills Agenda.

Another trend of interventions in curricula aims specifically at increasing private sector participation and engagement in supporting learners' access to the labour market. This may entail creating occasions for dialogue and/or interaction between learners and employers, via internship, mentorship and apprenticeship opportunities (see Table 10).

In **Brazil**, for example, the Professional Education for Green Economic Development and Employment promotes cooperation with the private sector through ad hoc public-private partnerships. A strategic priority for **Canada** is providing students with paid work experience, as well as offering flexible and comprehensive training and apprenticeship programmes and giving companies incentives to hire students, including wage subsidies. Relevant programmes include the Youth Employment and

Skills Strategy Program, the Student Work Placement Program and the Canada Summer Jobs initiative. **Mexico** promotes dual education through agreements and alliances under which students receive part of their training directly in companies and industries in various productive sectors.

Saudi Arabia's Human Capability Development Program provides guidance towards and awareness about a successful entry into the labour market and aims to nurture a culture of innovation and entrepreneurship. Another programme in Saudi Arabia is the Job for Every Graduate initiative, which helped to cover the gap between learners/trainees and the labour market, creating specific job opportunities for every graduate of the country's Technical and Vocational Training Corporation.

In **Türkiye**, the Ministry of National Education is strengthening the link between vocational education and the business sector by signing cooperation protocols with the business sector. Protocols have already been signed with 236 private actors, providing internships for students, training for teachers and scholarships and employment opportunities for graduates.

Another way of addressing changing skills demands is to improve TVET delivery and better streamline TVET provision into general education. Vocational education and training is covered in many of the programmes mentioned above, as well as by others specifically dedicated to it. Examples include **Australia's** Job Trainer Fund, Job-Ready Graduates Package, and Skills for Education and Employment (SEE); **Brazil's** Professional Education for Green Economic Development and Employment; **Canada's** Youth Employment and Skills Strategy Program (YESSP), Canada Summer Jobs (CSJ) and Student Work Placement Program (SWP); **China's** Employment Assistance Project; the **European Union's** European Skills Agenda; **France's** Trades and qualifications campuses; **India's** Programme on Vocational Education; **Indonesia's** Transformation of Vocational Education initiative; **Italy's** Reform of TVET and Higher Technical Institutes ITS (Higher VET); **Japan's** Policy for the future of work post-Covid 19; **Mexico's** Dual Education in Upper Secondary Education; the **Republic of Korea's** support to Vocational Education in Secondary School; **Türkiye's** Sectoral Centres of Excellence; and the **United Kingdom's** Skills for Jobs Lifelong Learning and Opportunity for Growth. For more in-depth analysis of the role of TVET, please refer to section 3.5.

4.5. A new role for teachers

Teachers are one of the building blocks of education systems worldwide and, as such, are instrumental actors in making education provision (as well as learners) ready for the future. Within the new social contract for education, the role of teachers should be aligned with the principles of collaboration, cooperation, solidarity and diversity. Teachers should establish trust relationships with students and trainees in order to help learners develop the skills needed for the future.

At the same time, teachers will need to continuously acquire new knowledge and work flexibly with learners from different contexts, of all ages and of different socio-economic backgrounds. This implies significant challenges for governments, which must make available decent salaries, benefits and working conditions for teachers, provide adequate and continuous learning opportunities (such as effective pre- and in-service training), equip teachers with appropriate instructional materials and offer attractive career pathways and opportunities for promotion. For example, the new role of teacher leader at school and district levels is becoming increasingly relevant in creating successful school transformations and in implementing innovative practices.

Importantly, teachers, who are a key stakeholder group in the transformation of education, will need to be involved in all aspects of policy and programme reforms through social dialogue processes with governments. A number of countries have set teacher training as a key strategic priority in their education programmes (see Table 10). For example, the **European Union's** European Education Area actions and initiatives are focused around five strategic priorities, which include a raft of measures explicitly designed to support the work of teachers and trainers. **Mexico's** Teacher Training Programme for Upper Secondary Education specifically recognizes teachers as indispensable agents of change in transforming teaching in classrooms and campuses. Updating and training for teaching jobs is valued and recognized as a key pillar to address curricular change. The **Russian Federation's** national project Education aims at promoting the professional development of teaching staff and management personnel by providing advanced training programmes to develop teachers' skills, as well as by granting direct support to teaching staff and education management personnel. The Education Recovery Plan in England (the **United Kingdom**) is expected to provide 500,000 teacher training opportunities to enable teachers to access world-leading training and development, appropriate for whatever point they are at in their career.

In **Brazil**, the Ministry of Education is working to qualify and train national teachers in the use of new technologies and methodologies that could improve the quality of vocational education to better meet the needs of the labour market. **India's** National Initiative for School Heads' and Teachers' Holistic Advancement (NISHTHA) aims to improve learning outcomes at the elementary level. This Integrated Teacher Training Programme covers, among others, all teachers and school heads at the elementary level in all government schools in the country. **Indonesia** has launched a Transformation of Teachers and Education Personnel initiative, encompassing a wide variety of training programmes for teachers and principals. And **South Africa** is developing a programme for training master trainers, who, in time, can support the development of their peers.

Many G20 countries have planned significant reforms to prepare teachers for an age of digitally enhanced pedagogy by ensuring that all educators have the capacity and opportunity to effectively use ICT tools and digital resources in their professional practices. Such programmes target the use of ICT in teaching and learning, supporting teachers' digital competence, and expanding capacities to support disadvantaged students through assistive technology. As such, many countries have increased their efforts to provide both initial and ongoing professional development that teaches educators how to use, teach with, and deliver lessons through ICT.

Brazil's Laboratory of Creativity and Innovation for Basic Education (LABCRIE), for example, helps teachers and managers develop their capacity to use technologies in pedagogy, in order to meet the demands of the current educational context. Meanwhile, the country's EduCA+ Education, focused on Learning for the World 4.0, provides teacher training in the use of applications, virtual environments and electronic devices for learning. **Italy**, too, is making significant investments in the development of an integrated system to enhance teachers' digital skills and enable teaching staff to implement innovative teaching methodologies.

Saudi Arabia's Human Capability Development Program is committed to improve teachers' competency and educational system quality. It has defined a set of initiatives that focuses on high-quality and empowered teachers and school leaders. The initiatives will develop teachers skills on new curricula as well as introduce them to modern teaching methods and dealing with all students categories. The program has defined initiatives that focuses on teachers mentorship program, teacher performance criteria assessment refresh, as well as incentivizing high-quality teachers to work at schools with low-outcome students.

Saudi Arabia supports also trainers and trainees in the use of electronic training systems. It offers distance-training programmes to sustain educational professional development processes for those in educational jobs, helping them keep pace with global trends towards e-training systems. Similarly, **South Africa's** Operation Phakisa: ICTs in Education and **Canada's** Province of Quebec's Digital Action Plan for Education and Higher Education both support teacher training in digital skills and the digital transformation.

The **United Kingdom's** Get Help with Remote Education initiative in England offered a one-stop-shop for teachers and leaders, supporting them in remote education provision. As part of the initiative, teachers could access a portal with technology to support remote education and peer-to-peer training and guidance on how to use technology effectively for curriculum delivery.

In Scotland (United Kingdom), the national online learning environment Glow is a closed platform, managed centrally and only accessible to learners, teachers and others directly involved in school education. Contracts for Glow services are tightly controlled and do not permit data mining or advertising, thereby protecting all user data.

4.6. Protecting and reimagining schools

Teachers may be the main actors, but schools are the main places where learning happens, enabling the transformations required by the transition to the future of work. To better achieve this, schools need to evolve and transform, mirroring and facilitating developments in pedagogies, curricula and teachers. With consideration for the specific cultures of the local communities in which they are situated, schools should be platforms for collaboration and care, welcoming students, professionals and other people and offering a wide variety of flexible learning opportunities. Schools must also support teachers in performing their tasks, helping them to build communities of learners in their classrooms. Finally, schools should leverage the progress enabled by technology development and promote the digital transformation, even as they themselves benefit from it.

However, despite the pressing need to make schools more inclusive and collaborative communities, most current policies related to schools focus on providing access to digital technology, materials and training. For example, since the COVID-19 pandemic, **Brazil** has significantly expanded its provision of distance education and internet connectivity to teachers and students. Countries with more developed economies are currently

expanding digital technologies in schools, such as the Province of Quebec in **Canada**, with its Digital Action Plan for Education and Higher Education, **France** with its National Accelerating Strategy for Education and Digital Technology, **Germany** through its DigitalPakt Schule, **Japan** with its GIGA School Programme and England (the **United Kingdom**) with its Digital Inclusion Strategy.

Italy is promoting the educational and organizational digitalization of schools as part of its National Digital School Plan as well as of the new National Plan for Recovery and Resilience. The two plans call for short-term and long-term actions, based on the particular needs of different types and grades of schools. They envisage the transformation of school spaces from traditional classes to innovative learning environments, both physical and virtual, connected to the internet and integrated with digital technologies.

Saudi Arabia is investing in digital support for education, providing learning management systems to schools and access to materials and internet connectivity across the country. Madrasati (My School) is the national e-learning management platform, owned by the Ministry of Education. It provides learning opportunities across different e-learning models: blended, synchronous, asynchronous, distance learning and face-to-face technology-enhanced learning. Saudi Arabia is also planning a Modern Digital School programme. The idea behind it is to equip selected digital schools with the latest and most advanced digital equipment, as well as an advanced digital library and virtual laboratories that will help to improve educational outputs.

The **European Union's** Digital Education Action Plan puts digital education at the centre of the education landscape in Europe, which will directly impact schools. The first pillar of the plan aims to promote the development of a European digital education ecosystem. This requires implementing the right infrastructure, connectivity and digital equipment, but also necessitates effective digital capacity planning and development, including up-to-date organizational capabilities, as well as high-quality learning content, user-friendly tools and secure platforms.

Some key interventions also target school infrastructure. Among others, **Mexico's** National Information System for Upper Secondary Education (SEEMS) promotes continuous collection of information regarding the conditions of coverage and infrastructure of schools across the country, including the budgetary needs and priorities of each state. The **Russian Federation's** Education project explicitly sets modernization of school infrastructure, including in rural areas, as a key objective

of interventions. The goal is to renovate (and even rebuild) schools, equipping them with up-to-date equipment.

Other interventions have a marginal impact on schools and focus primarily on reforming timetables, learning calendars and class organization. The goal of these interventions is to increase flexibility and enable the learning ecosystem to adapt to international recommendations in terms of learning efficiency. **Saudi Arabia**, for example, is transforming the academic year from a two-semester system into a trimester-based school year to provide more flexibility and optimal resources utilization, a three-semester system, to enhance learning outcomes and handle educational wastage in the various education stages. It is preparing an academic calendar model for the next five years that considers the distribution of learning days and official holidays to achieve the optimal global rate for the number of learning days. In 2021, **France** halved class sizes in pre-primary, 1st and 2nd grade (children aged 5, 6 and 7 years old) in priority education areas (20 per cent of schools in France), since classes with fewer pupils enable teachers to provide better support for children, especially those with the greatest difficulties, thus contributing to reducing educational inequalities in disadvantaged areas.

4.7. Promoting learning places, across space and time

Formal education in schools by teachers will remain important to the future of work, but a better future also requires extending the spaces and times in which learning occurs. People need access to learning experiences in different spaces, such as community centres, parks, cultural institutions and elsewhere. Educational opportunities should be available to workers and to adults in general who are looking to update their skills, such as in the context of work-based learning (WBL). WBL will play a key role in making sure that workers keep up to date with their changing jobs and the different skills profiles needed, in alignment with new developments and trends responding to the future of work.

Some policies expand access to lifelong learning opportunities, in alignment with the learning spaces pillar for the future of work. In most countries, the transformation of TVET and tertiary education is considered to be the main engine to face the future of work, as reflected in efforts to improve education-industry cooperation, build new learning pathways and introduce new credentials including micro-credentials.

Many countries are working to increase WBL opportunities. As mentioned above, **Mexico** is expanding access to dual

education, and **South Africa** is approaching training centres and companies to provide on-demand and work-based training. Similarly, in **Germany**, an ongoing expansion of WBL is under way with the introduction of new company training centres. Germany is implementing the Alliance for Vocational and Advanced Training in order to update its apprenticeship programmes and inspire more young people to take part in dual training.

Canada has a range of programmes designed to provide better student WBL opportunities. Among them, the Student Work Placement Program supports the creation of work-integrated learning (WIL) opportunities to better prepare post-secondary students for work, reduce risks for employers and enable post-secondary institutions to keep pace with changing on-the-job expectations. Employers offering work placements can receive wage subsidies of up to 50 per cent of the wage cost for the placement and up to 70 per cent for under-represented students. The Innovative Work-Integrated Learning initiative, launched in 2019, supports shorter opportunities that leverage technology to broaden the reach to students who otherwise would not participate. Similarly, Future NB-Future Wabanaki is a local programme in the Province of New Brunswick that aims to foster meaningful experiential learning opportunities across the province. The goal is to provide students with a variety of experiential learning opportunities with employers before graduation from high school, community college and university. This is expected to strengthen students' readiness to embark on careers related to their field of study, strengths and interests, and also to support labour force growth through recruitment and talent retention for New Brunswick's employers. In the province of Saskatchewan, the Ministry of Advanced Education recently released Saskatchewan's Guide to Micro-credentials, which provides learners, postsecondary institutions, employers and industry groups with a foundational understanding of micro-credentials, along with meaningful ways to make use of micro-credential programming.

Indonesia's Kampus Merdeka – Merdeka Belajar programme provides opportunities for university students to obtain direct work experience and develop their soft skills. Through **India's** National Apprenticeship Training Scheme (NATS), technically qualified youth are given practical knowledge and skills through work-based training offered by private actors as part of dedicated apprenticeships.

Other countries are focusing on offline and online training. **Argentina's** Professional and Continuous Training Plan works as an articulated set of policies, programmes, projects and institutions that promote quality professional training offerings for workers. The programme, implemented by the Ministry of Labour, Employment and Social Security, aims to structure, systematize and promote initiatives with the goal of improving the skills, abilities and qualifications of workers (including the evaluation and certification of skills acquired). Since its update in 2020, the strategy for skills development adopted as part of the programme has been upgraded to improve digital skills and access to digital technology.

Within **Australia's** Skills for Education and Employment (SEE), a national network of registered training organizations delivers full-time and part-time training through face-to-face, distance or mixed-mode learning modalities. Training courses may be focused on foundational skills, concentrating on language, literacy, numeracy or digital literacy, or may have any or all of these elements embedded within the context of a vocational course.

China has introduced the Employment Assistance Project for Students of Low Socio-economic Background, a programme supported by the Ministry of Finance and the Ministry of Education. The programme has offered offline training for 50,000 students and online training for 580,000 students. By 2025, it is anticipated that it will offer offline training for 500,000 students and online training for 2 million students. The programme has selected 135 universities and colleges as national training centres to provide onsite training to local students. Students are guided through the job search process, while the training package covers guidance on self-recognition, career exploration, selection of career targets, making CVs and interview preparation.

Saudi Arabia's Human Capability Development Program focuses on developing the national skill framework and skill recognition system to lead the next industrial revolution, as well as the skills accreditation system to assess skills of individuals for better alignment between tertiary education offerings and labor market needs. The program provides citizens that have exited full time education with lifelong learning opportunities including development opportunities.

4.8. Conclusion

This chapter analysed the future-readiness of education systems across G20 countries and beyond by examining their policy orientations and specific initiatives. The wide array of initiatives in progress reflects the commitments made by countries as part of the G20 Joint Education and Labour and Employment Ministers' Declaration in 2018 and 2021. Their objective is to ensure smooth school-to-work transitions in a world characterized by huge socio-economic uncertainties, including, among others, the rapid digitalization of our economies and societies (exacerbated by the outbreak of the COVID-19 pandemic), the green transition towards more sustainable economies, the persistence of informal economies and the uneven demographic transitions that countries are currently experiencing.

Preparing education systems for the future of work requires collaboration in building more inclusive, flexible and quality education provisions worldwide. To do so, policies are acting simultaneously on a set of interconnected levers to reconfigure modern education systems:

Pedagogies are going through a restructuring process, paving the way for more cooperation, collaboration and solidarity, particularly with respect to disadvantaged groups. G20 countries have also started to implement policies promoting pedagogies designed to foster the well-being and mental health of learners, while preparing them for the future of work.

Changing and adapting **curricula** may seem to be an obvious and urgent intervention, but, if conducted in isolation, it will not be enough. Several G20 countries are making adjustments to their curricula by incorporating in-demand skills, in view of the need to align with labour market demand and in anticipation of future trends.

Teachers are upgrading their role, both in the way they interface with students and in the way they perform their traditional tasks. For this to happen, G20 countries are working to provide decent salaries, benefits and working conditions for teachers. Policies aim to create adequate and continuous learning opportunities, equip teachers with appropriate instructional materials and offer attractive career pathways and opportunities for promotion.

Schools are evolving to become places for inclusion, often through the integration of new architectures, spaces and tools. This will facilitate developments in pedagogies, curricula and teachers. The majority of G20 countries' interventions aim at equipping schools, particularly through providing access to digital technologies, materials and training.

People will benefit from new **learning places** and, therefore, opportunities, located outside education institutions, within a lifelong learning perspective. In most countries, the transformation of TVET and tertiary education is considered as the main engine to face the future of work, as reflected in efforts to increase cooperation between education and industry, build new learning pathways and adopt new credentials, including micro-credentials. Work-based learning represents a key area of intervention in this domain.

Table 10: Future of work programmes**ARGENTINA****Title:** Professional and Continuous Training Plan

Beneficiary group/s: Employed and unemployed workers who participate in training policies and certification of labour skills, with special focus on unemployed workers with low qualification, women, youth and people with disabilities

Implementer: Ministry of Labour, Employment and Social Security

Short description: The plan encompasses an articulated set of policies, programmes, projects and institutions, coordinated by the Ministry of Labour, Employment and Social Security, aimed at promoting quality professional training offerings and evaluating and certifying workers' labour skills. Its purpose is to structure, systematize and promote programmes, projects and actions aimed at improving the skills, abilities and qualifications of workers.

Partnership/Collaboration: The plan is implemented on the basis of social dialogue, in coordination with national, provincial and/or municipal public sector agencies, with representatives of the labour and production sectors, with universities and training institutions and with civil society organizations.

Digital technology: The strategy for skill development was updated in 2020, and has been improved to incorporate lines of work oriented to improve digital skills and access to digital technology, as well as accessibility. Several elements use and promote digital technology. First, vocational training based on the knowledge economy has been introduced to promote a reduction of the digital gap in broad sectors of the population (particularly youth), while at the same time aiming to reskill workers whose trades are impacted by technological change. It also supports the development of skills required in new trades emerging from the 4.0 revolution. Secondly, Resolution SE 208/2020, the Regulation on the conditions required for the implementation of virtual courses, was introduced to help sustain professional training actions during the COVID-19 preventive and mandatory social isolation. An e-learning platform owned by the Ministry of Labour has been constructed, where the training courses of different actors can be hosted, in addition to the Ministry's material. And technological innovations have been adopted to facilitate accessibility to vocational training and improve the conditions for its implementation, including registration of participants online and issuance of online certificates.

BRAZIL**Title:** EduCA+ Education Focused on Learning for the World 4.0

Beneficiary group/s: Students, teachers, principals, school staff, productive sector partners

Implementer: Federal Institute of Education, Science and Technology of Minas Gerais (IFMG), National Service of Industrial Learning (SENAI) Steinbeis Sibe do Brasil

Short description: The programme is based on Education for World 4.0, a reflection of the fourth industrial revolution, which not only requires equipment and software, but also well-defined strategic pedagogical planning and teacher training. It seeks to develop a strategic plan, train education professionals (teachers, technicians and managers) and ensure investments in institutions dedicated to professional and technological education for the World 4.0. A Latu Sensu Post-graduate course in Digital Education is being developed, which will upgrade professional skills in the use of digital technologies in professional and technological education, improving and transforming teaching practices in an environment that requires the use of digital technologies.

Partnership/Collaboration: The partners for the development of this initiative include the Federal Institute of Education, Science and Technology of Minas Gerais (IFMG), the Federal Institute of Education, Science and Technology of Espírito Santo (IFES), the Foundation for Support to the Development of Extension, Research, Vocational and Technological Education (FADEMA), and the National Service of Industrial Learning (SENAI) Steinbeis Sibe do Brasil.

Digital technology: Essential. The 4.0 workshops are based on four pillars: (i) physical space equipped with digital technologies, shared by students from different educational levels responsible for the development of innovation projects; (ii) teachers trained in workshop methodologies and guidance of technological innovation projects; (iii) workshops focused on training in the use of digital technologies, with encouragement of entrepreneurship and innovation; (iv) partnership with the productive sector.

BRAZIL

Title: Professional Education for Green Economic Development and Employment

Beneficiary group/s: Youth, women, vulnerable groups

Implementer: GIZ (German Corporation for International Cooperation), Ministry of Education

Short description: This programme seeks to improve the employability conditions of graduates of professional education courses in sustainable sectors of the Brazilian economy.

Partnership/Collaboration: The project targets partnerships with or direct involvement of vocational education partners and private sector representatives in identified sustainability sectors. The entire programme involves the following agencies in planning and delivery of the programme objectives: GIZ, the Brazilian Ministry of Education, the Secretariat of Professional and Technological Education (Setec/MEC), Federal Network EPCT, National Service of Industrial Learning (SENAI) and National Rural Learning Service (SENAR).

Digital technology: Essential. Digital skills are identified as important to the programme. The trainings that will be developed are based on the use of digital solutions.

CANADA

Title: Let's Talk Science (LTS)

Beneficiary group/s: Students, teachers, parents/caregivers, girls/women, those of low socio-economic status, those in rural areas, Indigenous youth, youth with disabilities

Implementer: Innovation, Science and Economic Development Canada

Short description: Let's Talk Science (LTS) is a national non-profit charitable organization that offers programmes, services and resources to promote awareness, skills development and youth engagement, in science, technology, engineering and math (STEM). The organization helps youth build critical competencies needed for future jobs by providing STEM-based programming for early years to grade 12 youth, building career awareness of students and teachers, and offering career-building opportunities to post-secondary students who volunteer with LTS.

Partnership/Collaboration: LTS engages in a number of partnerships to support the development and delivery of its programmes. For example, LTS provides support and programme resources to youth-serving organizations to leverage their programming and extend its reach to more youth. In addition, LTS has a variety of partnerships with science and technology organizations to leverage these organizations' science knowledge by adapting their content for LTS programming. LTS also partners with federal, provincial and institutional partners to mobilize their expertise and enrich its programming for youth.

Digital technology: Essential. Digital technology is very important in achieving LTS's programme objectives. Through its programmes, LTS supports youth development and learning through high-quality, issues-based STEM resources that provide relevant and accurate information aligned with Canadian jurisdictional curricula.

CANADA

Title: Manitoba Skills, Talent and Knowledge Strategy (STKS) (Province of Manitoba)

Beneficiary group/s: Students (post-secondary), post-secondary institutions, employers, industry sectors, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds

Implementer: n/a

Short description: Manitoba's Skills, Talent and Knowledge Strategy (STKS) provides strategic direction to publicly funded post-secondary institutions and outlines actions needed to accelerate recovery, advance Manitoba's economy and promote positive outcomes. The goal of the strategy is to ensure the province has people with the right skills at the right time, to quickly rebound from the pandemic, ensure resilience and support economic growth, now and in the future.

Partnership/Collaboration: The strategy includes targeted actions to strengthen alignment between post-secondary institutions, immigration, training and employment services, and labour-market needs. The strategy provides the framework and principles as foundation for the province to take a collaborative approach, working with partners across Manitoba, including industry, businesses, community leaders and organizations, educational institutions and Indigenous leaders.

Digital technology: n/a

CANADA

Title: Future NB-Future Wabanaki

Beneficiary group/s: Students, employees, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds, Indigenous peoples

Implementer: All institutions are co-owners of the initiative.

Short description: Future NB (New Brunswick) has been created by partners including students, educators, faculty, educational institutions, Indigenous peoples, private industry, not-for-profit organizations and government leaders. The programme provides students across New Brunswick with a variety of experiential learning opportunities with employers prior to graduation from high school, community college and university. This strengthens the job-readiness of students related to their field of study, strengths and interests, and supports labour force growth through recruitment and talent retention for New Brunswick employers.

Partnership/Collaboration: Partnerships and collaboration include: a) the Canadian government departments whose mandates focus on youth, skills development, labour market needs and economic development; b) national experiential-learning partners with focus on funding, research, thought leadership, training and lobbying; c) the Government of New Brunswick departments whose mandates support strategic workforce development plans in a variety of sectors including agriculture, tourism, health, skilled trades, digital/ITC sector, economic development and many others; d) New Brunswick employers and their associations from a wide variety of sectors including IT, forestry, health, food production and others; e) New Brunswick post-secondary institutions; f) New Brunswick Department of Education and Early Childhood Development; g) Indigenous organizations and representatives with a focus on inclusive and culturally appropriate support; and h) organizations representing equity-seeking groups with a focus on removing barriers to participation.

Digital technology: Essential. Digital technology has been very important in the effective data collection of the initiative. Through a common platform, technology is leveraged to support, inform and connect partners, students, educators and employers.

CANADA

Title: Supporting Micro-credential Development (Province of Saskatchewan)

Beneficiary group/s: Students, employers

Implementer: Saskatchewan Ministry of Advanced Education

Short description: In Saskatchewan, micro-credentials are recognized as short, knowledge, skills and/or competency-based programming that should have clear, articulated assessments and demonstrated connections to the labour market and lifelong learning. The Ministry of Advanced Education recently released Saskatchewan's Guide to Micro-credentials (the Guide). The Guide is designed to provide learners, post-secondary institutions, employers and industry groups with a foundational understanding of micro-credentials along with meaningful ways to use micro-credential programming. The Ministry has also created a landing page where learners can find more information on micro-credentials as well as see which institutions are currently offering them.

Partnership/Collaboration: The Guide was created through consultations with Saskatchewan post-secondary institutions as well as employer and industry stakeholders. For micro-credential training to be relevant to the current and emerging needs of the labour market, programme development (and implementation) between post-secondary institutions and employer/industry members must be collaborative to ensure that the skills and competencies that learners earn are recognized and valued in the labour market. The Saskatchewan Ministry of Advanced Education developed and maintains the Guide, and post-secondary institutions can develop micro-credential programming as they deem appropriate.

Digital technology: Somewhat important. Several post-secondary institutions are using digital platforms to create and issue micro-credentials as digital credentials, with several adopting the MyCreds digital credential platform. Micro-credentials issued as digital credentials provide the earner with full control to share the credential in any way they deem appropriate. The digital credential also allows the viewer (e.g., an employer) to seamlessly review all of the relevant information in the credential (e.g., assessments, skills/competencies earned, etc.).

CHINA

Title: Employment Assistance Project for Students of Low Socio-economic Background

Beneficiary group/s: Students of low socio-economic background

Implementer: Ministry of Education, Ministry of Finance

Short description: The major objective of the programme is to assist students of low socio-economic background to resolve their employment problems, prepare them for work and facilitate their education-work transition by offering online and offline training on employability. By 2025, it is anticipated that the programme will offer offline training for 500,000 students and online training for 2 million students.

Partnership/Collaboration: The institutions responsible for the delivery of the programme are the Ministry of Education, the Central Special Lottery Public Welfare Fund of China and the Ministry of Finance. The programme has selected 135 universities and colleges as national training centres for employability and competency. Quality employability online courses are consolidated on the National Employability Training Network. The implementation of the programme is based on the 135 national training centres (offline) and the National Employability Training Network (online).

Digital technology: Somewhat important. Part of the programme involves offering online training to students from low socio-economic backgrounds. Online training is implemented via the National Employability Training Network. Digital technology plays an important role in the programme, since access to the programme requires a computer or smartphone.

INDIA

Title: National Apprenticeship Training Scheme (NATS)

Beneficiary group/s: Students, low socio-economic, those in rural areas, all graduate and diploma students

Implementer: Department of Higher Education (DHE)

Short description: NATS was set up to enhance the employability of students who have completed their undergraduate courses or diplomas. It is a one-year programme equipping technically qualified youth with practical knowledge and skills required in their field of work. Apprentices are provided training by organizations at their place of work. Trained managers with well-developed training modules ensure that apprentices learn their jobs quickly and competently. At the end of the training period, apprentices are issued a Certificate of Proficiency by the Government of India which can be registered at all employment exchanges across India as valid employment experience.

Partnership/Collaboration: The programme works extensively with employers/industry in the public sector (at the central as well as state levels) as well as private sector. NATS is implemented by DHE through four regional Boards of Apprenticeship/Practical Training (BoATs/BoPTs) located at Chennai, Kanpur, Kolkata and Mumbai. All Government and Non-Government Educational Institutions/Establishments are participating as per Apprentices Act, 1961.

Digital technology: Essential. NATS is operated through an online ecosystem that facilitates a linkage between industry, institutions and trainees through a national portal: <https://portal.mhrdnats.gov.in>.

INDIA

Title: National Initiative for School Heads' and Teachers' Holistic Advancement (NISHTHA)

Beneficiary group/s: Students, teachers, principals, all teachers and school heads in government and government-aided schools at elementary level, faculties of District Institutes of Education and Training (DIETs), officials and resource persons from Block Resource Centres (BRCs) and Cluster Resource Centres (CRCs)

Implementer: The Department of School Education & Literacy, Ministry of Education

Short description: Under the Centrally Sponsored Scheme of Samagra Shiksha, in 2019/20 the Ministry of Education launched the National Mission to improve learning outcomes at the Elementary level through an integrated teacher training programme: the National Initiative for School Heads' and Teachers' Holistic Advancement (NISHTHA). This integrated programme aims to build the capacities of around 4 million participants, covering all teachers and school heads at the elementary level in all government schools, faculty members of State Councils of Educational Research and Training (SCERTs) and District Institutes of Education and Training (DIETs), as well as officials and resource persons from Block Resource Centres (BRCs) and Cluster Resource Centres (CRCs) in all States and UTs.

Partnership/Collaboration: The programme is implemented by the Department of School Education & Literacy in partnership with States and UTs, other ministries, teacher training institutions and CSOs. The programme is carried out in collaboration with academic bodies such as the National Council of Educational Research and Training (NCERT) and the National Institute of Educational Planning and Administration (NIEPA).

Digital technology: Essential. The NISHTHA elementary face-to-face programme was integrated with digital content and technology-enabled teaching methods to support participating teachers. NCERT developed a mobile app and Learning Management System (LMS) based on Moodle (Modular Object-Oriented Dynamic Learning Environment) (<https://nishtha.ncert.gov.in/>). NISHTHA Online for elementary teachers includes multiple approaches for interaction, including text-based modules along with videos, live sessions by National Level resource persons on DTH Swayam Prabha TV Channel and an interactive voice response system.

INDONESIA

Title: Transformation of Vocational Education

Beneficiary group/s: Students, teachers, principals

Implementer: Ministry of Education, Culture, Research and Education

Short description: The Ministry of Education, Culture, Research and Technology takes a comprehensive approach to encouraging linking and matching with industry, allowing education units to provide industry-based learning that prepares graduates to work and become entrepreneurs. To that end, the Indonesian Ministry of Education, Culture, Research, and Technology launched the Centre for Excellence Vocational High School (SMK PK) and Vocational Emancipated Campus (Kampus Merdeka Vokasi) programmes to encourage change through interventions in various aspects of vocational education. These include increasing educators' technical capabilities, building education unit leaders' capacity to be more agile in leading change, improving the quality of practical facilities and infrastructure aligned with the needs of the world of work, formulating curriculum policies that allow for optimal alignment with the competency needs of the world of work, determining institutional policies that allow for unrestricted learning between secondary and higher education levels, and, most importantly, increasing opportunities for the world of work to be directly involved in education unit.s It is hoped that these changes will enable educational units to provide students with industry-based learning, allowing them to maximize the development of their abilities, talents and interests.

Partnership/Collaboration: The Ministry of Education, Culture, Research and Education implements this programme in coordination with local governments, vocational universities and the National Accreditation Body for Higher Education (BAN-PT).

Digital technology: Essential. Technology is required in the programme to train educators throughout Indonesia, ensure better school evaluation and management, and to reach out to and match industry with education units.

ITALY

Title: Reform of TVET and Higher Technical Institutes ITS (Higher VET)

Beneficiary group/s: Students

Implementer: Ministry of Education

Short description: This reform is accompanied by an investment aimed at increasing the educational offering of higher technical institutes. It also involves investing in teacher training in order to double the number of trained professionals.

Partnership/Collaboration: The reform of Higher Technical Institutes aims to strengthen cooperation with companies, universities, research centres and local authorities.

Digital technology: Somewhat important. The investment provides the means to realize a digital platform related to the tertiary educational offering of ITS.

JAPAN

Title: Global and Innovation Gateway for All (GIGA) School Program

Beneficiary group/s: Students, teachers, school staffs

Implementer: The Ministry of Education, Culture, Sports, Science and Technology (MEXT) in cooperation with the Digital Agency, the Ministry of Economy, Trade and Industry, and the Ministry of Internal Affairs and Communications.

Short description: Global and Innovation Gateway for All (GIGA) School Program aims to improve the quality of education and utilization of ICTs.

Partnership/Collaboration: N/A

Digital technology: Essential role. The project aims to improve the quality of education and utilization of ICTs, including the maintenance of PC terminals used by elementary and junior high school students. The government subsidies support the development of large-scale presentation devices and other devices deployed in schools.

JAPAN

Title: Policy of the future of work post-COVID-19

Beneficiary group/s: Those of low socio-economic status

Implementer: Ministry of Education, Culture, Sports, Science and Technology

Short description: The policy aims to provide programmes at universities and professional training colleges that meet the needs of society, with a focus on the digital field and other growth fields, for workers, non-regular workers and unemployed persons affected by new COVID strains, and to support their smooth transition to and from employment.

Partnership/Collaboration: The Ministry of Education, Culture, Sports, Science and Technology. Partners with universities, professional training colleges and other educational institutions, labour bureaux and private companies to provide educational programmes and support for labour mobility, such as finding a job or changing jobs.

Digital technology: Essential. Manapass, a portal site operated by the Ministry of Education, Culture, Sports, Science and Technology that provides information on courses for working adults, will be used to disseminate information on courses and the results of this project.

JAPAN

Title: Policy package of JPY 400 billion for 3 years to reinforce investment in human resources

Beneficiary group/s: Job seekers, those of low socio-economic status

Implementer: Cabinet Secretariat, Ministry of Health, Labour and Welfare (Director-General of Human Resources Development, Employment Security Bureau), Ministry of Education, Culture, Sports, Science and Technology, Ministry of Economy, Trade and Industry

Short description: The government aims to realize Japan's 'new capitalism' by promoting the circulation of growth and distribution. As the drivers of economic wealth and strength, human resources are the key to realizing this aim. The world is drastically changing, spurred by green and digital technology. By investing in human resources, the government will create new added value and distribute benefits to the people who can create future growth.

Partnership/Collaboration: In order to support workers' independent skill development, the educational training allowance subsidizes a part of the expenses of educational training at private training institutions specified by the Minister of Health, Labour and Welfare. (Human Resources Development Subsidy subsidizes a certain portion of cost when employers provide training for their employees). Although not included in the package, public vocational training and job-seeker support training are conducted at private educational training institutions.

Digital technology: Essential. In public vocational training, there is online training so that participants can take courses remotely. Some courses covered by the educational training allowance can be completed online.

JAPAN

Title: Meister High School (Project to renovate human resource development for next-generation regional industries)

Beneficiary group/s: Students

Implementer: n/a

Short description: Professional high schools and industry work together to promote cutting-edge vocational human resources development to produce human resources that will lead local industries.

Partnership/Collaboration: High schools work with industry to implement this programme.

Digital technology: Somewhat important. The purpose of this measure is to develop curricula for cutting-edge vocational human resources development, and although the development and utilization of digital technology is not an essential component, initiatives related to the learning of digital technology may be implemented in the project.

REPUBLIC OF KOREA

Title: Supporting Vocational Education in Secondary School

Beneficiary group/s: Students, teachers, principals, school staff

Implementer: Ministry of Education, provincial offices of education, specialized high schools including Meister High School

Short description: The programme provides vocational education opportunities that match students' desire and aptitudes, and fosters technical talent with practical skills by operating a curriculum highly relevant to the industry field. In addition, the provision of job experience and employment support through field training helps students who wish to directly enter into the job market after graduating from vocational high school to find high-quality jobs.

Partnership/Collaboration: n/a

Digital technology: Essential. In order to foster a beginner-level skilled workforce in the new industries (e.g., digital) and respond to the changing job environment, it is necessary to incorporate digital technology throughout vocational education, and to increase students' understanding and use of digital technology. The curriculum includes programmes such as handling digital application devices and creating and making use of content using digital applications. In particular, in vocational high schools, digital applications are used for experiments and field practice.

RUSSIAN FEDERATION

Title: Long-term programme to promote youth employment through 2030

Beneficiary group/s: Students ISCED 6–8 (Bachelor's and above)

Implementer: Ministry of Science and Higher Education, Ministry of Labour and Social Protection

Short description: The programme includes measures such as: a) the provision of subsidies to employers for employing certain categories of young specialists, b) assistance in relocating young people to regions where there is a lack of human resources, c) development of youth entrepreneurial initiatives, and d) further promotion of the Work in Russia web portal and the introduction of a digital system of practical training. The main goal is to promote opportunities for young people to realize their professional, occupational and entrepreneurial potential. The programme has the following targets: 1) forming career strategies for young people in accordance with personal and professional aptitudes and the needs of the labour market; 2) ensuring that training complies with the professional and qualification requirements of employers and business actors; 3) establishing appropriate conditions for the professional development of young people through a combination of educational and working (entrepreneurial) activities; and 4) developing additional mechanisms to mitigate the risks of youth unemployment.

Partnership/Collaboration: n/a

Digital technology: Essential. The programme involves the use of public and analytical services available via the Work in Russia unified digital platform for employment and labour relations.

RWANDA

Title: Strengthened continuous professional development and management of teachers across all levels of education in Rwanda

Beneficiary group/s: Students, teachers, principals, parents/caregivers

Implementer: Rwanda Basic Education Board, Rwanda TVET Board

Short description: This programme will ensure all school teachers, TVET instructors and higher education lecturers have the appropriate competencies to deliver the competence-based curriculum. It aims to provide school-based mentoring for all newly qualified teachers; increase the English-language proficiency of all teachers and lecturers; increase the number of teachers practising school-based CPD linked to competence-based curriculum; increase the use of TVET trainers' qualifications framework and occupational curricula for all trades; increase the pupil–qualified teacher ratio in primary and secondary; encourage greater use of Teacher Management Information Systems (TMIS) for effective management and distribution of teachers; and improve teachers' welfare in order to attract and retain high-quality teachers in the teaching profession.

Partnership/Collaboration: Teacher training institutions.

Digital technology: Essential. Teachers have to be equipped with digital technology skills and knowledge. Digital applications can be used to share real-time data and gather information, such as attendance and scores. In order to implement ICT in education, teachers need to be equipped with internet and ICT devices.

RWANDA

Title: Strengthened STEM across all levels of education in Rwanda to increase the relevance of education for urban and rural markets

Beneficiary group/s: Students, teachers, parents/caregivers, with a focus on girls/women

Implementer: Ministry of Education

Short description: The programme aims to establish STEM schools of excellence in every district, increase career guidance in lower secondary schools, enable greater use of local resources in teaching science in primary schools, improve laboratory facilities in schools with STEM subjects, and increase the number of students, especially girls, who receive scholarships to pursue higher education courses in STEM subjects.

Partnership/Collaboration: The programme is implemented by the Ministry of Education in collaboration with Rwanda Basic Education Board, Rwanda TVET Board, the University of Rwanda and Rwanda Polytechnics. It is to be implemented through the Education Sector Strategic Plan (2018–2024).

Digital technology: Essential. Digital technology will help in remote learning (through e-learning platforms). Research can be made easier using digital technology and STEM interest can be encouraged at a very young age (i.e., in pre-primary). The use of ICT in teaching and learning in STEM is important.

SAUDI ARABIA

Title: Transformation of Community Colleges into Applied Colleges

Beneficiary group/s: Students, job-seekers

Implementer: Community colleges

Short description: Saudi Arabia's labour market needs are evolving in light of the country's economic development plan. However, there is a mismatch within the educational system and changes are needed supply labour market needs. At the same time, community colleges have lost their role in providing technical education.

Partnership/Collaboration: n/a

Digital technology: Essential. The programme uses technology services in multiple ways, such as the marketing campaign for all applied colleges and the platform for the execution phase.

SINGAPORE

Title: Review on Opportunities and Pathways in Applied Education

Beneficiary group/s: Students

Implementer: All polytechnics and the ITE are involved in this programme

Short description: The Institute of Technical Education (ITE) provides technical and vocational education for students through full-time National Institute of Technical Education Certificate (Nitec) courses, Higher Nitec courses, and traineeship programmes conducted in partnership with employers. Polytechnics provide hands-on, practice-based learning experience within a dynamic and progressive learning environment, leading to a diploma qualification. Work attachments with industry partners, which ranges from 6 weeks to 6 months, are also offered as part of the curriculum. Almost 70 per cent of each student cohort choose the polytechnic and ITE route as they move into post-secondary education. The Review on Opportunities and Pathways in Applied Education was thus conducted in 2021 to ensure that students are equipped with relevant skills to remain resilient and thrive in the future economy.

Partnership/Collaboration: The polytechnics and ITE recognize the importance of strong industry partnerships and will continue to engage industry partners to curate quality workplace exposure opportunities for students. For the ITE, students will henceforth be exposed to two linked industry attachments (IA) – a three-month IA in Year 2 and a six-month IA in Year 3. The polytechnics will explore options such as job shadowing, short job stints and career accelerator programmes, for students to take on additional industry exposure opportunities beyond the compulsory third-year internship.

Digital technology: Somewhat important. Institutions have embarked on initiatives to streamline and automate processes using digital tools, in order to achieve their objectives more efficiently.

SOUTH AFRICA

Title: Introduction of the Three Stream Model in Curriculum

Beneficiary group/s: Students, teachers, parents/caregivers, principals, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds

Implementer: Department of Basic Education

Short description: The proposed Three Stream Model seeks to a) implement learning pathways which meet the diverse needs of the young people of the country; b) empower learners to be creative and organized system thinkers; c) promote the acquisition of skills and competencies for a changing world; d) focus on the foundational skills of reading, writing and counting (arithmetic); and e) improve the quality and efficiency of learning outcomes throughout the sector.

Partnership/Collaboration: The implementation of the model includes an approach where learners will be exposed to Work Integrated Learning (WIL). This process partners with a number of private industries for WIL. Additionally, funding for the programme is received through the European Union.

Digital technology: Essential. Some subjects are delivered through digital technologies, such as engineering graphics and design.

SPAIN

Title: Environmental Education for Sustainability Action Plan (PAEAS) (2021–2025)

Beneficiary group/s: Students, teachers, principals, school staffs, NGOs, associations, group of environmental educators, general public (citizenship)

Implementer: n/a

Short description: The programme's objective is to promote a cultural change that allows for an adequate response to contemporary socio-environmental challenges in a coordinated, participatory manner and with institutional and social co-responsibility, including the active and equal contribution of women as agents of change. In the first phase, work was organized around 10 areas of Environmental Education for Sustainability in Spain. The priority lines of action were collected, incorporating a multisectoral and broad vision of environmental and sustainability education. The second phase concerned the drafting of the Action Plan, coordinated by a working group made up of the Ministry for Ecological Transition and the Demographic Challenge and the Ministry of Education and Vocational Training, which was subjected to a public consultation process. The Action Plan is currently being implemented.

Partnership/Collaboration: The Action Plan is promoted by both ministries and aims to incorporate environmental education for sustainability in the formal, non-formal and informal spheres of education, in accordance with the 2030 Agenda for Sustainable Development and the Spanish Education Law (LOMLOE). The management and development of this Action Plan depends on the Ministry for Ecological Transition and the Demographic Challenge, through the National Centre for Environmental Education (CENEAM) and the National Parks Autonomous Agency (OAPN), as well as on the Ministry of Education and Vocational Training. Within the scope of their competences, these organizations will guide and promote the actions included in the Action Plan, ensuring the coordination and provision of the necessary resources. Many other agents, both public and private, will be involved, in the interests of a greater diversification of budgetary sources and broader participation.

Digital technology: Somewhat important.

UNITED ARAB EMIRATES

Title: The future of work post-Covid-19: consider specialized academies in K-12 and hybridization between academic and advanced technical vocational education; promote the utilization of advanced skills framework, lifelong learning and social emotional intelligence as core competencies.

Beneficiary group/s: Students, teachers, principals, with priority groups of girls/women, those of low socio-economic status and those in rural areas

Implementer: Ministry of Education

Short description: In the post-COVID era, schools act as incubators of entrepreneurship and innovation programmes. Greater emphasis is placed on practical and project-based learning in UAE specialized academies providing vocational and applied courses in health and social care, business enterprise, environment, health and safety, applied technology and logistics. Flexible and integrated learning options and accelerated programmes equip students to earn university credits while at school and introduce them to the world of work. All resources are designed and reviewed constantly in consultation with private and public institutions, which form part of the curriculum committees. Students are offered multiple tracks to success following either applied, general, advanced or elite streams suited to their academic or vocational aptitude.

Partnership/Collaboration: The programme will be implemented by the Ministry of Education in collaboration with the Ministry of Happiness and the Ministry of Tolerance.

Digital technology: Essential. Digital technology is used as a vehicle for the conveyance of values, as well as for digital textbooks and platforms. All students and teachers are provided with necessary ICT tools.

UNITED ARAB EMIRATES

Title: Tolerance and coexistence: For global rapid recovery from many crises, that humanity faces; promoting tolerance and coexistence as core values in education to be embedded in the character profile of global citizens

Beneficiary group/s: Students, teachers, principals, parents/caregivers, school staff, girls/women, those of low socio-economic status, those in rural areas, linguistic minorities, those from migrant backgrounds

Implementer: Ministry of Education

Short description: Citizenship and Responsibility, Commitment and Transparency, Participation and Accountability are the core values of tolerance and coexistence embedded and promoted by the Ministry of Education, and are clearly reflected in K-12 curricula. The United Arab Emirates has established the Ministry of Happiness and the Ministry of Tolerance to ensure peaceful coexistence among its more than 200 nationalities, which form a global melting pot across the country's seven emirates. UAE schools are an incubator for promoting the values of tolerance, peace, security and multiculturalism. Students are educated on the values of justice, respect and equality, with zero tolerance for hatred, fanaticism and causes of division and difference. The National Tolerance Programme works to establish these values and developing frameworks that support its continuity.

Partnership/Collaboration: The Ministry of Education works with partners to ensure that all textbooks and learning materials authored internally and co-authored externally promote principles of tolerance and coexistence and value humanity irrespective of race, region, colour and hatred of any kind or manifestation. The Ministry of Happiness and the Ministry of Tolerance are also part of the programme delivery/implementation.

Digital technology: Essential. Digital technology is used as a vehicle for the conveyance of values, as well as for digital textbooks and platforms.

UNITED KINGDOM

Title: Skills for Jobs Lifelong Learning for Opportunity and Growth

Beneficiary group/s: Post-16 and adult learners, further education teachers, employers.

Implementer: Department for Education

Short description: The Skills for Jobs initiative will reform the skills sector by putting employers at the heart of reforms to tackle skills gaps, providing businesses with the talent they need to thrive. This will help to ensure more people can get the skills they need to get good jobs, wherever they live. The reforms will give people the opportunity to train, retrain and upskill flexibly throughout their lives to get great jobs in sectors needed by the economy and will boost productivity.

Partnership/Collaborations: Different components of the programme are to be jointly delivered with the following departments: Department for Business, Energy and Industrial Strategy (BEIS), Department for Digital, Culture, Media and Sport (DCMS), Department for Work and Pensions (DWP) and Department for Levelling Up, Housing and Communities (DLUHC).

Digital technology: Somewhat important. The programme involves both improving access to digital platforms and plans to strengthen the digital skills of the beneficiaries of the programme.

5.

Recommendations to G20 countries

The Indonesian Presidency has called on G20 countries to recover together and recover stronger, or **RESET**:

Recover together: G20 countries must reach and retain every learner to enable them to re-engage with learning in effective learning environments, starting with understanding each student's needs, assessing their learning level, and training and supporting teachers in using diagnostic, formative and summative assessments in light of adjustments to learning modalities and curricula. Efforts should also be made to build strong foundational skills and develop psychosocial health and well-being, including through gender-specific support, so every child is ready to learn.

For adolescents and young people, certified multiple pathways (including digital) should be implemented, including accelerated and catch-up programmes that can enable them to develop the full range of skills (including transferable, digital, entrepreneurial and job-specific) they need to succeed in school and work and to engage with their community. They should also be provided with opportunities to practise and apply those skills through activities such as civic engagement, apprenticeships and internships.

This will be even more effective if countries can leverage global knowledge and data, engage in peer learning through the G20 platform and other platforms such as the Global Education Meetings, and support less advanced countries.

Strengthen Education: G20 countries need to fix the pre-COVID crisis gaps that have been further exacerbated by the pandemic, while at the same time addressing new gaps stemming from the pandemic's effects on student learning and well-being. The capacities of education systems must be reinforced to enable them to achieve universal quality education for every child, in line with Education 2030 international commitments.

Transform for the future: All G20 countries need to transform their education systems to get ready for the future including the future of work, to leverage digital technology and innovate to be future-ready, and to advance equity and inclusion, as noted in the revised G20 Skills Strategy. This requires addressing multiple digital divides: the connectivity divide (both inside and outside of school), the divide in access to devices, the divide in opportunities to learn through world-class digital learning solutions, the digital skills divide, and social divides – not least the gender digital divide in terms of access to technology and acquisition of digital skills. Learners must be equipped with the knowledge, skills and attitudes that can enable them to live, work and develop sustainably. If countries are to transform and be ready to meet present and future challenges, they must promote integrated, adaptive, flexible and dynamic teaching and learning on all levels in education systems. This will support the acquisition of critical and creative thinking, technical and social-emotional skills, promote student well-being, and foster global citizenship and education for sustainable development – all of which are vital to prepare learners for the future of work and to promote lifelong learning.

G20 lifelong learning systems will likely need resources, knowledge and organizational capacity to RESET based on to this framework. Their success will hinge on their ability to build on innovations spurred during the crisis, to mobilize the teaching workforce and to use stimulus packages and other resources for effective recovery, transformation and the advancement of SDG 4. A strategic, whole-of-government and whole-of-society approach to skills will be essential for countries seeking to RESET their lifelong learning systems.

In this context, the G20 Skills Strategy being developed jointly by the Employment and Education Working Groups, is a reference framework which highlights the importance of developing adequate skills and lifelong learning as a

guide for countries to move forward in their journey to achieve universal quality education and promote lifelong learning, in order to benefit individuals, enterprises, economies and societies. The G20 Skills Strategy lays sound foundations for future cooperation between the Employment and Education Working Groups to support and monitor lifelong learning strategies and systems in G20 countries.

International cooperation and solidarity, knowledge sharing and peer learning will be critical. This is in line with the message of the United Nations Transforming Education Summit, which demonstrates the world's concerted efforts to help shape a more peaceful, inclusive, gender equal and sustainable future for humanity and the planet.

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