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Synthesis report

Digitalization in teaching and education in Ethiopia, Kenya, Malawi, Rwanda and the United Republic of Tanzania

Digitalization, the future of work and the teaching profession project

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Foreword

Digital technologies are reshaping and re-envisioning social and economic sectors across the globe. Education systems are caught up in this transformational moment, embracing digitalization to respond to and drive a knowledge society and economy. Teachers are at the centre of delivering the ambitious agenda of preparing learners to meaningfully participate in a digitally-enhanced society and changing world of work. As digital technologies are transforming education systems, they are also changing the work of teachers and affecting their professional and working conditions.

This report summarizes the findings of two sets of studies on digitalization in teaching and education in Ethiopia, Kenya, Malawi, Rwanda and the United Republic of Tanzania. The first set of studies was launched in February 2020 to capture the changes taking place in the education sector in relation to digitalization, including challenges, best practices and the impacts on the teaching profession. The declaration of the COVID-19 outbreak as a pandemic in March 2020 resulted in calls for the rapid and widespread uptake of technology in the delivery of education. With education systems accelerating efforts in response to the crisis, in August 2020, follow-up studies were launched in the countries to document these efforts and the implications for the teaching profession, as well as long-term strategies and plans.

The International Labour Organization (ILO) Centenary Declaration for the Future of Work, adopted in 2019, calls for "the acquisition of skills, competencies and qualifications for all workers throughout their working lives" and prioritizes effective lifelong learning and quality education for all. Qualified, motivated and well-supported teachers with decent work are key to delivering the promise of education for a better life and decent work. The 1966 ILO/UNESCO Recommendation concerning the Status of Teachers sets out principles on the professional work of teachers, including access to training and professional development. Drawing on these principles, this report identifies ways forward for education systems as they adapt to rapid technological changes, placing teacher capacities and decent work at the centre of inclusive and sustainable change. In doing so, the report also contributes to the achievement of Sustainable Development Goal (SDG) 4 on quality education and lifelong learning opportunities for all and SDG 8 on productive employment and decent work for all.

The Sectoral Policies Department (SECTOR) of the ILO has a long-standing collaboration with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The ILO and GIZ regularly coordinate through the International Task Force on Teachers for Education 2030 (TTF), where both act as steering committee members. In the context of the TTF, ILO and GIZ have engaged in joint activities on teacher-related issues. The current cooperation between ILO and GIZ has furthered knowledge development and sharing in support of achieving SDG 4. SECTOR would like to express its sincere gratitude to GIZ for the continued cooperation and the financial support which GIZ – on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ) – has provided for this research.

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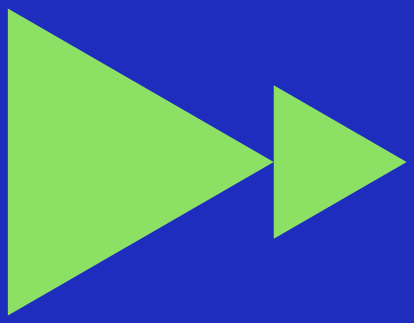
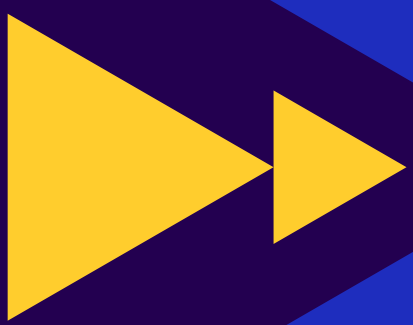
Contents

Abbreviations

CPD	continuous professional development
D-TEST	Digital Technology for Education Sector Transformation
EMIS	Education Management Information System
GEQIP	General Education Quality Improvement Programme
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICT	information and communication technology
ILO	International Labour Organization
ITU	International Telecommunication Union
SDG	Sustainable Development Goal
TESP	Teacher Education Support Project
TMIS	Teacher Management Information System
TTF	International Task Force on Teachers for Education 2030
TSC	Teachers Service Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization





1. Introduction

The advancement of technology and the transformation of the knowledge economy has significantly impacted the workforce needs of today, with increasing demand for knowledge-based workers that are equipped in particular with digital skills and that are adaptable to shifting labour markets and workplaces. In light of these changes, countries are increasingly looking to build cultures of innovation that would result in new ways of thinking and creating, of developing solutions to pressing issues and of driving sustainable economic growth and social benefits. To fully participate in and contribute to the knowledge economy and society, core competencies, which are often presented as twenty-first century skills – collaboration, communication, digital literacy, creativity, critical thinking and problem-solving, among others – are essential. Digital skills are often regarded as vital for the acquisition of other twenty-first century skills, especially in a growing digital society and economy.[1]

This rapidly changing context has accelerated a revolution in education that is reflective of labour market trends of flexibility and innovation. Education systems, however, have progressed at a different pace than labour markets, resulting in a mismatch between jobs and skills. Research indicates that young people lack the adequate skills, most notably digital skills, to respond to the rapidly changing world of work.[2] As much as the changing context is impacting students, it is also shifting the conditions and the nature of work of teachers, who themselves need to develop the same skills that are increasingly required by society and the economy. Lack of digital skills on the part of teachers can limit the adoption of digital technology in the classroom. Embracing lifelong learning as a principle of capacity development is essential. For teachers this means an openness and commitment to new and interactive pedagogical approaches, use and integration of new technologies in teaching and learning and ongoing acquisition of emerging skills. Preparation for this should begin in pre-service training with qualified teacher trainers.

Lifelong learning needs to be coupled with institutional commitments to quality education as a basic right for all, provisions of effective and responsive pre-service training, support for continuous professional development (CPD) and assurances of decent work and fair remuneration for teachers. In the countries analyzed in this report, deficits in all these areas continue to persist, with inadequate wages and benefits, lack of meaningful input from teachers, insufficient investment in CPD and lack of prioritization of digital skills development in training programmes. This is compounded by an absence of related infrastructure and affordability of equipment needed to support acquisition of digital skills and to enable participation in the digital world. Addressing these trends can positively impact the working conditions of teachers and the quality of education, and enhance the capacity of the education sector to respond to and prepare learners for the changing social and economic environment.

Digital technologies are also impacting the administration and management of schools, including through the collection of data and information to improve teacher management processes and to inform education planning and policy-making. It has provided new ways for monitoring and evaluating student learning, as well as new avenues of communication between teachers, parents, schools, communities and governments. These processes involve investments in appropriate infrastructure, digital tools and digital skills for those beyond teachers, including administrators and school leaders, who can play a significant role in encouraging the integration of technology in teaching and learning and education management.

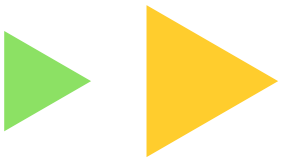
In consideration of the above, this report synthesizes the findings of ten case studies in five Eastern African countries on digitalization in primary and secondary school teaching and education, including in the context of the novel coronavirus disease (COVID-19). The focal countries are Ethiopia, Kenya, Malawi, Rwanda and the United Republic of Tanzania[3] – countries that are looking to further digitalization efforts in the education sector as part of national strategies for socio-economic development as well as to

1 International Bureau of Education (IBE)-UNESCO, "Twenty-first Century Skills".

2 ILO and International Telecommunication Union (ITU), *Digital Skills and the Future of Work: Challenges and Opportunities in a Post COVID-19 Environment*, Discussion Note, 2020.

3 The country studies can be accessed at: www.ilo.org/education.

achieve the aspirations of the African Union's Agenda 2063. The findings of the studies are based on an analysis of relevant policies, research reports and news media as well as interviews with key education stakeholders and international organizations and development partners. The studies were launched as part of a pilot phase for an ILO-GIZ initiative on *Digitalization, the future of work and the teaching profession*, which explored how education systems and the teaching profession are adapting to changing social and economic conditions, with a primary focus on digitalization. The report first outlines the findings of the studies conducted prior to the COVID-19 pandemic and then presents the implications of the pandemic on digitalization in teaching and the work of teachers. It uses the conclusions and findings of the studies to develop action points for a way forward.



2. The ILO and the teaching profession

Skills, education, training and lifelong learning have long been an integral part of the ILO's mandate on employment promotion and decent work. The ILO Centenary Declaration for the Future of Work, adopted in 2019, directs the efforts of the ILO, among other priorities, to "promoting the acquisition of skills, competencies and qualifications for all workers throughout their working lives as a joint responsibility of governments and social partners". To address this challenge, the Declaration calls on ILO Members to strengthen the capacities of all people to benefit from the opportunities of a changing world of work through "effective lifelong learning and quality education for all".[4] The Declaration draws on principles of quality education and skills development which had previously been elaborated by the ILO in the Conclusions on skills for improved productivity, employment growth and development (2008),[5] the Human Resources Development Recommendation, 2004 (No. 195), the Human Resources Development Convention, 1975 (No. 142) and the Paid Educational Leave Convention, 1974 (No. 140).

Teachers have been part of the ILO mandate since the adoption of the 1966 ILO/United Nations Educational, Scientific and Cultural Organization (UNESCO) Recommendation concerning the Status of Teachers.[6] The principles of this Recommendation, as well as those of the 1997 UNESCO Recommendation concerning the Status of Higher-Education Teaching Personnel, are regularly examined by the Joint ILO–UNESCO Committee of Experts on the Application of the Recommendations concerning Teaching Personnel (CEART), established in 1968. Teachers and educators are covered by the ILO's fundamental principles and rights at work and a wide range of international labour standards.

Together with international labour standards on training, the 1966 Recommendation sets out a number of principles that can inform digitalization in teaching. These include the provision of financial support for students enrolled in teacher preparation programmes, the provision of opportunities and incentives for teachers to participate in CPD and the participation of teachers and their organizations in the development and dissemination of teaching methods. While the extent of the digital education environment was clearly not foreseen by the drafters of the 1966 Recommendation, the instrument also sets out that

> *Authorities should provide teachers and pupils with modern aids to teaching. Such aids should not be regarded as a substitute for the teacher but as a means of improving the quality of teaching and extending to a larger number of pupils the benefits of education.*
>
> *Authorities should promote research into the use of such aids and encourage teachers to participate actively in such research.*[7]

These considerations remain important as countries develop and adapt policies on the teaching profession in the context of increasing digitalization of education and training.

4 ILO, *ILO Centenary Declaration for the Future of Work*, 2019.

5 ILO, *Conclusions on Skills for Improved Productivity, Employment Growth and Development*, International Labour Conference, 97th Session, 2008.

6 ILO and UNESCO, ILO/UNESCO Recommendation concerning the Status of Teachers (1966), and UNESCO Recommendation concerning the Status of Higher-Education Teaching Personnel (1997), 2016.

7 ILO/UNESCO Recommendation (1966), paragraph 88.

3. Digitalization in teaching and education

Digitalization is broadly understood to be a change process that transforms and restructures industries, sectors and social life more generally through digital tools and technologies. Within the scope of this report, digitalization focuses on the use of digital tools and technologies for education management through data collection and analysis systems and for teaching and learning, including the development of necessary capacities amongst teachers and learners.

Digital technologies are fundamentally transforming the delivery and role of education, from pedagogy and curricula to teaching and learning modalities and location (in-person, virtually or at a distance). For the teaching profession it has facilitated less hierarchical, more interactive and learner-centred approaches to teaching and learning. Digital technology creates potential for more inclusive and quality education, but is limited by infrastructural deficits and barriers to access including affordability of equipment and resources. These challenges are more pronounced in developing countries. According to the International Telecommunication Union (ITU), approximately 87 per cent of individuals in developed countries used the internet in 2019. This is compared to only 19 per cent in the least developed countries.[8] The COVID-19 pandemic, which interrupted learning for nearly 1.6 billion learners in more than 190 countries,[9] demonstrated the critical need for connectivity during times of crisis for education, health services and livelihoods, leading to growing discussion of connectivity as a human right.[10]

In the focal countries, with some variation, fundamental challenges to the integration of digital technology in schools include: lack of electricity; poor internet connectivity and limited broadband; deficits in digital facilities in schools; absence of equipment and devices in schools and at home; insufficient safe storage for devices and equipment in schools; outdated technology; lack of affordable technology, technology-related services and data and internet bundles; weak data management; and funding shortfalls. These challenges are greater in rural and remote areas and in low income communities and households. Without universal access to digital infrastructure, up-to-date technology and connectivity, digital divides can widen existing social and economic inequalities, excluding millions from decent work opportunities and broader participation in an increasingly digital world. Increasing privatization of education in some countries has also produced concerns about disparity in access to digital technologies.

The digital competencies of teachers are another success factor in integrating digital tools for teaching and learning. Teachers, as well as teacher trainers, require training and CPD to effectively use digital tools and resources in (in-person and/or virtual) classrooms. In the focal countries, to varying degrees, lack of access to infrastructure and digital devices, teacher trainers with requisite digital skills, outdated teacher training curricula and limited financing for ongoing CPD are some of the major challenges to the digital capacity development of teachers. This is in addition to reluctance on the part of some teachers to take up technology to facilitate learning. In the context of globalization and massification, which carry risks of homogenization, it is increasingly being recognized that capacity development should take into account the local political, economic and social environments of countries.[11]

Policies play an important role in guiding and facilitating the integration of information and communication technology (ICT) in education. Along with guiding digitalization in the education sector, policies work to strengthen administration, financial management and accountability. Present in all the focal countries, these include national ICT policies, education sector ICT policies and frameworks and strategies to direct implementation and guide future directions, including on ICT use in teacher training and development (see box 1 for a short overview of some of these policies). Looking at the experiences of the focal countries, while progress has been achieved in some areas, several challenges can be identified. In the United Republic of Tanzania, policies and frameworks require further implementation, which is often hindered by infrastructural

8 ITU, *Measuring Digital Development: Facts and Figures 2020*, 2020.

9 UNESCO, "COVID-19 Educational Disruption and Response", 13 April 2020.

10 Anne-Marie Grey, "The Case for Connectivity, the New Human Right", *United Nations Chronicle*, 10 December 2020.

11 United Nations, *Report of the Secretary General: Roadmap for Digital Cooperation*, 2020.

deficits, and updating due to the evolving nature of technology. In Malawi, an ICT policy in education is yet to be developed, while in Ethiopia, there is an absence of a comprehensive teacher preparation and development policy as well as school-level ICT policies. Overall, effective policy implementation requires monitoring and evaluation and sustained funding, including in infrastructure development.

▶ Box 1. ICT Policies in Ethiopia, Kenya, Malawi, Rwanda and the United Republic of Tanzania

Most of the ICT policies in the focal countries emerged in the mid-2000s and built on earlier discussions and plans to digitalize the economy and society. In Ethiopia, early ICT policy included the 2006 ICT in Education Implementation Strategy and Action Plan and the 2009 National ICT Policy and Strategy. Ethiopia's current ICT policy is captured within the 2016 National ICT Policy and Strategy. ICT policy in Kenya included the 2006 National ICT Policy and the 2006 National ICT Strategy for Education and Training, the former of which was revised in 2019 to respond to rapid changes and developments in technology. Malawi's National ICT Policy was rolled out in 2013 to provide the regulatory context for the use of ICT in the country, including in the education sector. Rwanda developed an ICT in Education Policy in 2016, which was preceded by a sequence of plans to integrate ICT across sectors to transition Rwanda to a knowledge economy. In the United Republic of Tanzania, the 2003 National ICT Policy, which was revised in 2016, was developed to provide more affordable access to a range of ICT services to enhance sustainable socio-economic development. This policy is complemented by the 2007 ICT Policy for Basic Education, which guides integration of ICT in education.

Despite the many challenges, the growing use of mobile phones in Sub-Saharan Africa has offered opportunities to reach students without internet connectivity, through SMS and phone calls, and those with internet access, through messaging applications and learning platforms, during the COVID-19 pandemic. At the end of 2019, 45 per cent of the population in Sub-Saharan Africa subscribed to mobile services, with smartphone adoption rising rapidly, reaching 50 per cent of total connections in 2020. The number of mobile subscribers and smartphone connections is projected to increase in the coming years.[12] In some countries, including Ethiopia and Malawi, ministries of education worked with mobile operators and telecom providers to continue learning during school closures, including by removing fees for accessing education content, reducing data costs and connection rates and creating public internet hot spots.[13]

3.1 Technology and education and teacher management

Digital technologies are playing an increasing role in the management of education and teachers through the ongoing collection, maintenance and dissemination of timely and accurate data and information. A system of particular importance in the focal countries is the Education Management Information System (EMIS), which collects educational data and information about schools and schooling to inform policy planning and decision-making, including effective resource allocation. The information generated can assist with monitoring and evaluating education sector performance and outcomes as well as progress towards achieving SDG 4 on quality education. The Teacher Management Information System (TMIS), which collects teacher-focused data and information to be used for, among other things, training, recruitment and deployment, enhances the data collected through EMIS. The overall objective of EMIS and TMIS is to ensure quality teaching and learning through analysis of reliable data and information.

The development of EMIS and TMIS has not been even across the focal countries. Despite differences, there are common challenges experienced by the countries. One such challenge is low internet connectivity,

12 GSM Association, *The Mobile Economy: Sub-Saharan Africa 2020*, 2020.

13 Salman Asim, Shelby Frances Carvalho and Ravinder Gera, "Learning Equity during the Coronavirus: Experiences from Africa", World Bank Blogs, 3 June 2020.

resulting in the manual collection of data through hardcopy formats, which can lead to delays in reporting and accuracy issues. This challenge can be further aggravated by lack of electricity and limited broadband, especially in rural and remote areas, as experienced in the United Republic of Tanzania. In Kenya, the collection of similar data at different times by various directorates, semi-autonomous government agencies and the Teachers Service Commission (TSC)[14] has undermined data harmonization and institutional coordination, which could result in conflicting policy decisions. This concern is compounded by incomplete data sets due to poor response rates, particularly in private schools. In Ethiopia, the need for greater digital literacy among teachers, administrators, school leaders and education officials to facilitate the collection and analysis of data requires attention. A similar challenge, in addition to lack of appropriate devices, was noted in Rwanda, although examples of supportive initiatives, including those that support effective school leadership, are present. For example, the University of Rwanda – College of Education (URCE), with the support of VVOB – Education for Development, offers a year-long diploma programme to school leaders and education officials in strengthening school leadership. The programme is offered online and contains a unit on the use of ICT in school leadership and management.[15]

Some countries have put other internalized systems in place to collect school-related data and information, such as the School Information System in the United Republic of Tanzania, which is used to collect information on teacher and student performance, daily attendance and other school management activities. The system makes information accessible to all administrative levels in the education system via the internet to inform decision-making. However, the system is only being used in a few regions due to low internet connectivity.

Further advancement of information systems will require investments in infrastructure, technology and human capacity, as well as commitment on the part of school leadership for full adoption and implementation. As technology continues to play a more prominent role in education, accessing data and information on the integration of ICT in educational systems is increasingly important. This will require EMIS to adapt to new data needs to monitor progress toward quality education.[16] In addition to adapting to new data needs, it is vital that the data collected be used ethically and not in ways that exert undue control over teachers' work and human resource decisions.[17]

3.2 Digital skills training and development for teachers

The benefits of digital technology can be best realized when strategically introduced and used by skilled and confident teachers. Data on the proportion of teachers meeting required digital competencies remains lacking; however, across the focal countries, it is reported that there is a significant shortage of teachers trained in the use of technology, especially on ICT-enhanced pedagogy. In most of the focal countries, factors contributing to this shortage include: limited training on the integration of ICT for pedagogical purposes; insufficient number of teacher trainers with appropriate digital skills; inadequate quantities of computers and other digital tools in teacher training institutions and/or programmes; and ad-hoc CPD on ICT integration and digital skills development. Connectivity in teacher training colleges and/or programmes remains a major challenge in some countries. In Malawi, for example, a recent study revealed that 78 per cent of the 10 teacher training colleges observed had ICT equipment and only 44 per cent had access to the internet. Furthermore, 51.6 per cent of the lecturers that were observed did not promote the use of ICT in their lessons.[18] This demonstrates the need for greater digital skills development and ICT buy-in. Development partners have played a large role in some countries to equip teachers and teacher trainers with digital skills (see box 2 for an example in the United Republic of Tanzania).

14 The TSC is an independent constitutional agency mandated by the Government of Kenya to register and employ trained teachers in public schools and institutions. It has the mandate to recruit, assign to schools, promote, transfer, discipline and terminate the employment of teachers.

15 VVOB – Education for Development, "1,400+ Rwandan teachers and school leaders graduate", 29 November 2019.

16 UNESCO Institute for Information Technologies in Education (IITE), "EMIS to Monitor ICT in Education", 9 January 2020.

17 Phoebe V. Moore, *The Threat of Physical and Psychosocial Violence and Harassment in Digitalized Work* (ILO, 2018).

18 Malawi Institute of Education, *Draft Report for the Assessment and Evaluation of the New IPTE Curriculum in Malawi*, 2019.

▶ Box 2. Teacher Education Support Project (TESP) in the United Republic of Tanzania

TESP, a five-year project being implemented jointly by the governments of Tanzania and Canada, seeks to improve basic education in Tanzania by strengthening the teacher education system. The project aims to, among other things, improve provision of teaching and learning materials, access to and use of ICT in teaching and learning, the qualifications of college instructors and the quality and relevance of Teacher Education Curriculum (Programmes) Instruction. The project has distributed computers and equipment to 35 public teacher training colleges.

Source: Government of United Republic of Tanzania, *A Report of the Joint Education Sector Review Working Sessions*, Ministry of Science, Education and Technology, 2017; Edward Qorro, "Canada Hails Effective Implementation of UPE", *Daily News*, 11 February 2020.

Addressing some of these challenges will require improving the quality of initial and continuing teacher training and development by placing emphasis on ICT-enhanced and learner-centred pedagogy, including by upgrading or revising training curricula, investing in digital technology and appropriate infrastructure and committing to sustained, high-quality and relevant CPD for teachers and teacher trainers. Online opportunities for training and development are increasingly being offered for skills upgrading. To enable teachers to access such opportunities, sufficient digital tools and infrastructure, digital competencies and institutional supports need to be in place. Continuing training and development may require teachers to balance their professional and home life; the impact on personal time, nonetheless, should be minimized. Mobilizing resources will be key to realizing these priorities. As far as possible, teacher training and development should be financed by public investments.

3.3 Pedagogical uses of technology

In all the focal countries, digital technologies have been integrated in teaching and learning, but vary in intensity and application between regions, localities, schools and teachers. In Malawi, for example, key informant interviews revealed that technology is being used to: access online learning content; develop visual aids and learning material; prepare and deliver pre-recorded lessons; share resources; facilitate collaborative work; and maintain administrative records. Regular and universal use of technology, however, is impacted by the already noted challenges such as affordability of technology and internet connectivity and insufficient digital capacities, and in particular lack of access to electricity. The 2018 Population and Housing Census found that batteries were the main source of energy used for lighting households in Malawi (52.9 per cent), followed by electricity (11.4 per cent), solar power (6.6 per cent), candles (6.2 per cent) and firewood (4.4 per cent). This means that only 18 per cent of households have access to electricity (solar and electric power), with most of these being in urban centres.[19] A similar challenge is present in the United Republic of Tanzania, where the government is actively working to supply all villages with electricity by June 2021 as well as reduce electricity costs, with the implication being enhancement of schools' capacity to integrate technology.[20] Box 3 presents an example of an initiative in Ethiopia to integrate technology in the classroom, identifying challenges and issues in adopting technology.

Subsequent initiatives in Ethiopia include the national SchoolNet initiative, which was launched in 2004 and focuses on the deployment and use of ICT to facilitate teaching and learning in secondary schools and aims to develop a wide-area network linking all secondary schools in the country by making internet and online education accessible. As a follow-up to the SchoolNet initiative, another project was launched in 2013 under the General Education Quality Improvement Programme II (GEQIP II), which is supported by the World Bank and the United States Agency for International Development (USAID). GEQIP II has

19 Government of Malawi, *Population and Housing Census 2018: Main Report*, 2019.

20 "Rural Electrification in Africa: Tanzania Leads the Way", *Daily News*, 15 February 2020.

supported the provision of ICT infrastructure (computer-assisted learning facilities with appropriate and sufficient hardware and software) in 300 secondary schools and 10 universities, as well as the development of an e-learning system.[21] Another example comes from Kenya's Ministry of Information, Communication and Technology, which in 2016 launched the Digital Literacy Programme to effectively integrate ICT into teaching and learning by training teachers in the delivery of digital learning content and by providing digital devices to primary schools, as highlighted in box 4.

▶ Box 3. Satellite Plasma TV Project in Ethiopia

In 2003, the Ethiopian Government initiated the Satellite Plasma TV Project to improve the quality of secondary education by utilizing educational media in order to overcome: (a) the shortage of qualified teachers, especially in remote and inaccessible areas of the country; (b) the lack of good teaching models; and (c) the shortage of textbooks and inefficient distribution of teaching materials. Through the Satellite Plasma TV Project, pre-recorded course content is delivered by a remote teacher via the plasma screen, with the classroom teacher monitoring and explaining content. The plasma mode of instruction includes a blended approach, combining televised instruction with face-to-face instruction, with a 75 per cent and 25 per cent ratio respectively. In 2015/16, the Satellite Plasma TV Project broadcast lessons in a number of subjects to 1,710 secondary schools across the country through a total of 15,600 plasma TVs.

Various studies have critically evaluated the implementation and impact of the Satellite Plasma TV Project, with the overall conclusion being that the project did not realize most of the benefits of e-learning due to its technocentric orientation. The challenges identified in implementing the project include: (a) lack of consultation with stakeholders (including students and teachers) before launching the project; (b) it being a politically motivated initiative that followed a top-down decision-making process; (c) the transmission of content delivery being too fast to follow; (d) lack of competence in the language of instruction (English) on the part of students and teachers, particularly the mismatch between the speed and accent of the plasma presenter and the students' language capability; (e) the transmission being a one-way delivery, resulting in lack of interaction in the classroom; and (f) absence of a monitoring and evaluation mechanism.

Source: Berhanu Abera, "The Plasma-based Instruction in Ethiopia: Utopia or Dystopia?", *Educational Research and Reviews* 8, No. 24 (2013): 2325–2338; Centre for Educational Information and Communication Technology, *A Study on the New Satellite Television Content Programs in the Secondary Schools*, 2016; Sung-Wan Kim and Gebeyehu Bogale, "Does Satellite Program Satisfy Ethiopian Secondary School Education?", *International Conference e-Learning 2014* (2014): 79–86; Temtim Assefa, "Educational Technology Implementation in Ethiopian High Schools: Benefits and Challenges of the Instructional Plasma TV", *Handbook on Digital Learning for K-12 Schools* (2017): 413–427.

Successfully adopting digital technology in the classroom requires willingness and confidence on the part of teachers – a common concern that emerged across the countries. Lack of familiarity and experience with digital technology can deter teachers from incorporating it into pedagogical practices. In Rwanda, research commissioned by the African Institute for Mathematical Sciences and the Mastercard Foundation revealed that many teachers of science, technology, engineering and mathematics (STEM) and ICT, and subject leaders, expressed a lack of confidence in their abilities, a need for additional training on the new curriculum and a desire to upgrade their ICT skills, with a minority reporting that they were likely to use computers to prepare lessons. Related to these concerns, having access to sufficient digital content – open licensed, context-specific and linked to the curriculum – in different subject areas as well as exposure to good practices in the pedagogical use of technology is limited. In many of the focal countries, private schools with greater resources are making more use of digital technology.

21 Government of Ethiopia, *Fifth Education Sector Development Programme (2015/16–2019/20): Programme Action Plan*, Ministry of Education, 2015.

▶ Box 4. Digital Literacy Programme in Kenya

At its inception, the Digital Literacy Programme aimed to integrate ICT into teaching and learning in all public primary schools in Kenya. The components of the programme include: improvement of ICT infrastructure; development of digital content; capacity building of teachers; and procurement of ICT devices. Phase 1, which ended in June 2019, was themed "Learning to Use" and focused on exposing teachers and students to user-friendly technology. Phase 2, which was initiated in July 2019, was themed "Using to Learn" and focused on setting up shared digital learning resource centres in schools with appropriate infrastructure and tools. Phase 3, yet to be initiated, is themed "Using to Produce", and will focus on using technology to create and innovate, including toward employment creation.

In the early stage of the programme, 150 primary schools were supplied with devices, over 63,550 teachers were trained on ICT integration and 1.2 billion Kenyan shillings were disbursed for infrastructure. As of 2018, 22,675 public and private schools were connected with electricity to support the programme and digital content was developed for classes 1, 2 and 3. Overall, 80,980 teachers benefited from digital learning training.

In the classroom, teachers have observed change in the learning of their students, with digital devices increasing student attentiveness and allowing them to experience learning in practical and fun ways. It has also reduced absenteeism and increased admissions in schools. In addition, the development of teacher capacity in the use of ICT has led to collateral enhancement of ICT capacity in communities.

In terms of ICT infrastructure, several challenges to its implementation have been recorded: battery failure for those relying on solar power; high power bills; need for technical maintenance of facilities and provision of first-line support; lack of internet connectivity; lack of data on connectivity; inconsistent connectivity; destruction of telecommunication installations in areas prone to internal conflicts and border insurgencies; theft of tablets and computers; and lack of secure storage for ICT equipment.

Source: Government of Kenya, *2017/18–2019/20 Education Sector Report*, 2016; Government of Kenya, *Third Medium Term Plan 2018–2022: Transforming Lives: Advancing Socio-economic Development through the Big Four*, 2018.

Across the focal countries, teacher shortages and high teacher-student ratios and decent work deficits – heavy workloads, inadequate remuneration and salary increases and stagnant career mobility – were identified as major challenges in the public education system. Data and information on these conditions was not readily available for the private education system; however, country studies noted that terms and conditions of employment varied between private schools in terms of remuneration and teachers' contracts, among other things. Differences are also noted between public and private schools in some areas such as class sizes. In 2019 in the United Republic of Tanzania, for example, the pupil–qualified teacher ratio in public primary schools was 55:1, while in public secondary schools it was 23:1. On the other hand, in private primary schools the ratio was 25:1, while in private secondary schools it was 19:1.[22]

The possibility has been raised by some researchers and groups that the use of digital technology in education can overcome issues of cost, teacher shortages, decent work deficits and education access and quality, particularly in rural areas. Rather than viewing technology as the primary solution to issues in the education sector, emphasis should be placed on enhancing teacher capacity, including in the pedagogical use of technology, improving terms and conditions of employment and elevating the status of the profession, to retain the existing workforce and attract others to the profession. Technology as a tool should support and enable good teaching and quality learning, including by reducing workload and increasing

22 Government of United Republic of Tanzania, *Basic Education Statistics in Tanzania: National Data*, Ministry of Education, Science and Technology, 2019.

access to resources, rather than act as a replacement.[23] As much as technology can act as a solution, it can also introduce new barriers. While technology has opened doors for more students to access learning, it has also introduced new issues of accessibility, such as cost of access to new and emerging technologies and digital resources, platforms and applications requiring paid subscriptions.

In the focal countries, the extent of involvement of teachers' organizations in digitalization efforts is either limited or unknown. Effective collaboration and cooperation among government ministries, including ministries of education, teachers' organizations and the private sector is fundamental for meaningful progress, as set out in the 1966 ILO/UNESCO Recommendation concerning the Status of Teachers.

3.4 Ethical and critical use of digital technology

In all of the focal countries, despite the growing presence of technology in education, the ethical and critical dimensions of its use are often overlooked, including in teacher training institutions, professional development courses and policies encouraging the integration of technology in learning. Ethical and critical concerns relate to assessing the validity of digital sources and data, including distinguishing between reliable and unreliable information, ensuring academic integrity in coursework, establishing and protecting copyright over materials produced, ensuring data protection and online safety and security (including from phishing, viruses, scams and online bullying) and preventing health and mental risks. Potential ethical concerns can also include surveillance of both teachers and students. In addition to awareness campaigns and policy responses, teachers themselves need to be equipped with the requisite skills and knowledge to prepare students for the ethical and critical use of digital technology.

23 GIZ, *Education in Conflict and Crisis: How Can Technology Make a Difference? A Landscape Review*, 2016.

4. COVID-19 and digitalization in teaching and education

As demonstrated in the preceding section, digitalization efforts were already underway in the education sector prior to the COVID-19 pandemic, to varying degrees across and within countries. The crisis accelerated an already ongoing digital transformation in the sector, presented opportunities for innovation and creativity in teaching and learning, resulted in job creation in digital education content and technological development, produced collaborations between the public and private sector and prompted the acquisition of new skills, but also exposed existing infrastructural, technological, human capacity and decent work deficits. The crisis intensified the significance of the digital divide between regions, countries, urban and rural areas and income brackets, exacerbating already existing education inequalities.[24]

Given these conditions, the transition to distance learning was primarily reliant on educational radio and television programming, digitization of learning content, distribution of print learning materials and use of mobile devices to share resources and course material. Many learners, however, lacked access to electricity, reliable internet, radio and television and appropriate technology to participate meaningfully in these distance learning strategies. E-learning and virtual solutions were more readily adopted by families, students and private schools with greater resources. Although teachers in the public sector were able to retain their salaries during school closures, many in the private sector saw complete or partial suspension of wages and termination of contracts, as a result of some parents withholding or struggling to afford student fees. Some teachers were underutilized during the suspension of in-person teaching and learning as a result of insufficient digital devices and supportive infrastructure in households, as well as due to the distance strategies adopted by governments that did not envision the participation of all teachers.

Besides being institutions of learning, schools are spaces of social development and interaction, as well as social protection. Schools reduce child labour, early marriage and pregnancy and short-term hunger and nutrient deficiency through school feeding programmes. The disruption to schooling resulting from the pandemic may amplify these issues amongst vulnerable and disadvantaged children and youth.[25] In Malawi, for example, teachers' organizations are reporting increasing tendencies of underage marriage and child labour resulting from the impact of school closures. Girls are especially at risk, with many assuming responsibilities for household labour.[26] There is a growing concern that some of the most vulnerable students will not return to school, with UNESCO, in August 2020, warning that only one third of students would return to the classroom once schools re-open.[27]

The gradual re-opening of schools, which included stipulations to follow COVID-19 prevention measures including social distancing, handwashing and wearing of masks, exposed existing teacher and classroom shortages and institutional inadequacies in learning material and facilities. As countries engage in long-term planning toward building inclusive and resilient education systems, investing in infrastructure for distance learning, including provision of electricity, internet connectivity, more bandwidth and digital devices, enhancing the digital skills of teachers, administrators and education officials and incorporating technology into teaching and learning and promoting decent work should remain a priority. Involving teachers and their representative organizations as well as employer organizations in digitalization strategies is a vital aspect of successful implementation.

4.1 Immediate impact and responses

Following the first confirmed cases of COVID-19 and the closure of schools, Ethiopia, Kenya and Rwanda developed COVID-19 response plans for the education sector, which articulate immediate, medium- and

24 ILO, *COVID-19 and the Education Sector*, Sectoral Brief, 2020.

25 ILO and United Nations Children's Fund (UNICEF), *COVID-19 and Child Labour: A Time of Crisis, a Time to Act*, 2020.

26 Madalitso Kateta, "In Malawi, Teachers' Unions are Rallying to Protect Vulnerable Learners from Covid Fallout", *Equal Times*, 2 October 2020.

27 UNESCO, "As a New Academic Year Begins, UNESCO Warns that Only One Third of Students will Return to School", 31 August 2020.

long-term strategies to respond to the pandemic. The plans focus on ensuring the continuity of learning through alternative and distance learning solutions, enabling the safe and effective re-opening of schools, providing assistance to students that may have fallen behind in their learning and developing capacities and resilience to future crises. Malawi's National COVID-19 Preparedness and Response Plan included a cluster on the education sector response and no plan was put forward by the United Republic of Tanzania.

In the initial phase of the COVID-19 pandemic, the immediate response of the five countries was the closure of learning institutions and the implementation of distance learning strategies. Governments primarily relied on traditional distance learning approaches such as radio and television programming. These approaches, however, were not without challenges, including: lack of means to monitor student learning; lack of accessibility of lessons to varied learners, including those with disabilities; and absence of radio and/or television, particularly in rural households. Other challenges are indicated as in the case of Rwanda, where a monitoring report by the Building Learning Foundations showed that only 35 per cent of sample students in primary school followed their English lessons through Radio Rwanda, with language comprehension being cited as a possible reason for the low attendance. This is compared to 59 per cent that followed their Kinyarwanda lessons.[28] Additionally, parental support with distance learning activities, one of the factors contributing to effective distance learning, was uneven between countries.

Many countries also made efforts to adopt online learning during school closures, which was compromised due to the absence of technology, poor internet connectivity and overall infrastructure deficits. In Ethiopia, for example, only 19 per cent of the total population had access to the internet as of January 2020.[29] Most of the internet connectivity is via mobile phones. It has been reported that some of the lessons delivered via messaging applications lacked structure and a regular schedule. Similarly, in Kenya, only 22 per cent of children have access to digital learning. In addition to access being low, it is also inequitable. Children in private schools in Kenya are twice as likely to have access to digital learning than children in public schools.[30]

Across the focal countries, teachers tasked with continuing education online were often not adequately prepared or provided with sufficient resources, and, in some cases, lacked the requisite digital skills. In Rwanda, for example, Laterite and the Research for Equitable Access and Learning (REAL) Centre at the University of Cambridge conducted phone interviews with teachers and head teachers in August 2020 to assess their experience with continuing teaching and learning during the pandemic. Few teachers (18 per cent) and head teachers (41 per cent) reported having prior experience with online teaching and learning. For those with experience, it was generally received through a course or training online. Male teachers were more likely to have online experience than female teachers, 22 per cent and 9 per cent, respectively.[31]

In order to facilitate virtual learning, partnerships with organizations outside the education sector have been established. In Malawi, the Ministry of Education, Science and Technology signed a Memorandum of Understanding with Telekom Networks Malawi, a leading telecommunications service provider in the country, in April 2020 to provide free access to online education content to students for two months, depending on the situation.[32] The Ministry is also collaborating with onebillion and Voluntary Service Overseas (VSO), both non-profit organizations, on the *onetab tablet* project to provide children in rural areas with customized, low-cost tablets, which are pre-installed with an offline application containing learning material. Tablets have already been distributed to 700 households in two villages and there are plans to expand the project to another 5,000 households that are not able to access radio and television broadcasts.[33]

Job security as pertains to teachers was frequently referenced in the context of the COVID-19 pandemic. In Kenya, Malawi, Rwanda and the United Republic of Tanzania, teachers in the public sector retained employment and continued receiving their salaries. Some of their counterparts in the private sector, however, experienced suspension and termination of contracts, and in some cases suspension of benefits, once

28 Kinyarwanda is one of the four national languages of Rwanda.

29 For more information, see: https://datareportal.com/reports/digital-2020-ethiopia.

30 Uwezo, *Are Our Children Learning? The Status of Remote-learning among School-going Children in Kenya during the Covid-19 Crisis*, 2020.

31 Laterite and REAL Centre, "Effects of School Closures on Secondary School Teachers and Leaders in Rwanda: Results from a Phone Survey", 12 January 2021.

32 Patricia Kapulula, "Malawi, TNM Sign Online Learning Pact", *Malawi Voice*, 21 April 2020.

33 onebillion, "Fighting Learning Poverty in Malawi through Effective EdTech during C-19", 18 August 2020.

parents discontinued payment of tuition fees. Some of these teachers turned to other income generating activities, raising concerns about possible teacher shortages once schools re-open. Other teachers also continued to maintain their employment without remuneration. In Ethiopia, regulations were put in place requiring private educational institutions to continue paying teachers' salaries and parents to pay partial tuition fees for the education of their children.[34]

Initial responses to the pandemic appear to have been mostly unilateral in the five focal countries. A research study by Education International Africa Region found that teachers' organizations were not meaningfully consulted on responses to the COVID-19 pandemic in the education sector. In relation to school closures and/or re-openings, 10 per cent of respondents reported that their organizations were consulted and that their views were taken into account and 28 per cent reported that their organization was not consulted at all. Most of the respondents (51 per cent) indicated that their views were 'sometimes' taken into account.[35] A similar response was reported by an employers' organization in Malawi. Independent Schools Association of Malawi (ISAMA), a grouping of private school owners ranging from kindergarten to primary and secondary schools, stated that it was not consulted on the decision to close schools. The closure, according to ISAMA, happened when parents had tuition fee balances, creating fee collection challenges and financial strains.

4.2 Medium impact and responses

The majority of the focal countries adopted a phased approach to school re-openings due to COVID-19 health measures such as social distancing as well as availability of requisite teachers, classrooms and facilities.[36] In Rwanda, existing teacher-student ratios were challenged by COVID-19 prevention measures, which recommend 21 students per classroom, whereas the existing average is nearly 50 per classroom. Although efforts have been initiated, the government has encountered challenges with recruiting an adequate number of teachers to improve the teacher-student ratio and to attend to the new classrooms being constructed to reduce overcrowding.[37] Similarly, in Ethiopia, COVID-19 health measures limited class sizes to 20-25 students, with one student per bench, requiring recruitment of more teachers and building of more classrooms. Since July 2020, in Ethiopia, tens of thousands of new classrooms were built by the government and the community to ensure social distancing. For instance, in the Oromia Region, more than 32,000 classrooms were built.[38] In Kenya, similar investments have been made toward the making of new desks, the building of new classrooms, the hiring of more teachers and other infrastructural improvements. The re-opening of schools also created the need for adequate washing facilities and proper ventilation.

To prepare for the re-opening and operation of schools, countries developed health and safety protocols and guidelines. In addition to the disinfection of schools, reduced classroom sizes, the wearing of masks, enforcement of handwashing and availability of sanitizing agents, many of the guidelines included recommended measures for health and hygiene practices and provision of mental and psychosocial support for students and teachers. Box 5 highlights some of the health protocols issued by Kenya's Ministry of Education, Science and Technology.

Kenya's Ministry of Education, Science and Technology also produced training models for staff, learners, parents and education officials on COVID-19 guidelines and health protocols. The *Training Module for Staff of Learning Institutions on COVID-19 Guidelines and Health Protocols*, for example, aims to enable both teachers and non-teaching staff to implement health and hygiene measures prior to schools re-opening as well as during school operation. It provides exercises on identifying strategies to address the mental and psychosocial impact of the COVID-19 pandemic, with an emphasis on the benefits of securing adequate interventions such as counselling. The module exposes teachers to alternative modes of curriculum delivery, including through the use of technology, and clearly defines the role of staff to ensure a safe and healthy learning

34 Fana Broadcasting Corporation, "የግል ትምህርት ቤቶች ለሰራተኞቻቸው ሙሉ ደመወዛቸውን እንዲከፍሉ የሚያስገድድ ውሳኔ ተላለፈ", 21 April 2020.

35 Education International Africa Region, *COVID-19 and Education: How Education Unions in Africa are Responding*, 2020.

36 On 29 June 2020, Tanzania became the first country in East Africa to re-open its educational institutions.

37 Edwin Ashimwe, "Schools Need Over 18,000 Teachers to Plug Shortfall", *New Times*, 17 November 2020.

38 Fana Broadcasting Corporation, "በኦሮሚያ ክልል የኮሮና ቫይረስን በመከላከል ትምህርትን ለማስቀጠል እንዲቻል ከ32 ሺህ በላይ ተጨማሪ የመማሪያ ክፍሎች መገንባታቸውን ተገለፀ", 15 September 2020.

environment.[39] In Malawi, the government organized training for teachers on managing a classroom during the pandemic to ensure the safety and health of both themselves and their students.

▶ Box 5. Kenya's Guidelines on Health and Safety Protocols for Reopening of Basic Education Institutions amid the COVID-19 Pandemic

The Ministry of Education *Guidelines on Health and Safety Protocols for Reopening of Basic Education Institutions amid the COVID-19 Pandemic* includes the following:

- Class/cohort sizes be adjusted to ensure adherence to social distancing;
- Education institutional programmes reworked to avoid learners and trainees from gathering at one place in big numbers;
- Use of face masks by all learners and trainees, teachers, non-teaching staff and parents/guardians/visitors at all times within the school environment;
- Supply of adequate clean running water and liquid soap/hand sanitizers;
- Temperature monitoring and record keeping;
- Institution of health and hygiene practices;
- Referral systems for the provision of mental health and psychosocial support for learners, trainees and staff members;
- Continued learning and review of schools' daily routines;
- Procedures for handling suspected COVID-19 cases.

Source: Government of Kenya, *Guidelines on Health and Safety Protocols for Reopening of Basic Education Institutions amid the COVID-19 Pandemic*, Ministry of Education, Science and Technology, 2020.

Remediation and catch-up programmes will be established for students upon return to school because the implemented distance learning strategies did not materialize as expected for many students. A need for such programmes has been identified because many students were not able to access learning from home. At least 49 per cent of children cannot be reached through remote learning in Eastern and Southern Africa, either due to a lack of policies that support digital and broadcast remote learning or absence of appropriate devices that facilitate digital or broadcast learning.[40] Various measures are likely to impact teacher workloads, such as remediation programmes, amendments to teaching schedules, ensuring compliance to safety and health protocols and adapting to human resource shortages. As countries re-open learning institutions, they are also continuing to provide distance learning through radio and television as well as virtually.

4.3 Long-term plans and projections

The COVID-19 crisis has reinforced and accelerated the ongoing trend of digital transformation of the education sector, most notably in the areas of infrastructure and digital skills development. It has given further credence to already or newly developed education sector plans and strategies. In Ethiopia, for example, the crisis gave additional momentum to the ten-year Education Development Plan, 2020-2030, which acknowledges the need to adopt technology not only to respond to emergency situations and crises such as the COVID-19 pandemic but also to prepare students for 21st century jobs. One of the subcomponents

39 Government of Kenya, *Training Module for Staff of Learning Institutions on COVID-19 Guidelines and Health Protocols*, Ministry of Education, Science and Technology of Kenya, 2020.

40 UNICEF, *COVID-19: Are Children Able to Continue Learning During School Closures? A Global Analysis of the Potential Reach of Remote Learning Policies Using Data from 100 Countries*, 2020.

of the plan is to develop digitally intensive schools, which is further elaborated in the Sector Development Programme (ESDP) VI, 2020-2025, and will involve developing ICT infrastructure, including high-speed internet connectivity, and improving the capacity of digital technology utilization by developing digital policies, standards and strategies. The plan to digitalize in the education sector is now in the implementation phase with a project titled Digital Technology for Education Sector Transformation (D-TEST). In addition to developing ICT infrastructure, D-TEST places emphasis on teacher capacity development and support as well as facilitating management and administration of education.[41] Similar measures are underway in the other countries.

Digital transformation in the education sector has the potential to drive more innovation and inclusion and access toward more meaningful employment. Investments in digital skills, technology and communication and energy infrastructure, as well as efforts to promote digital affordability are vital components to ensuring an inclusive and equitable transformation. The COVID-19 pandemic has demonstrated the importance of digital readiness for the continuation of education and other services.

41 Government of Ethiopia, *Digital Technology for Education Sector Transformation (D-TEST)*, Ministry of Education.

5. Ways forward

With a focus on teachers, this report highlighted both digitalization initiatives and challenges to their implementation in the education sector in Ethiopia, Kenya, Malawi, Rwanda and the United Republic of Tanzania. The studies suggest that all of the countries have engaged in efforts to harness technology to increase access to and quality of teaching and learning through policies and the implementation of specific programmes. These efforts have had varying degrees of success and have had an impact on teachers' work, and they will influence the way in which these five countries train teachers and manage teachers' working and professional conditions. Keeping in mind relevant international labour standards and the ILO's commitment to providing access to lifelong learning, including for teachers, the studies suggest that countries could consider a number of measures to ensure equitable access to quality digital education services as they undertake their own digital transformations.

Develop comprehensive and forward-looking policies to guide digitalization in education

Creating an enabling ICT environment in the education sector requires policies and frameworks to guide investments, programmes and priorities and to establish roles and responsibilities toward inclusive, equitable and sustained digitalization. Such policies and frameworks can set out the roles of governments, employers' and workers' organizations, the private sector, schools, teacher training institutions and other stakeholders, and set out provisions to ensure equity in access to digital education. Policies and frameworks need to be developed through social dialogue and appropriate policy dialogue with key stakeholders.

Increase investment in digital technology and infrastructure in schools and for distance learning

Ensuring that all schools, communities and regions are connected with electricity, that there is universal access to high-speed internet connectivity and that teachers and students are provided with up-to-date technology is fundamental to responsive and innovative education systems. Appropriate public-private partnerships could lead to funding for technology, digital facilities and other resources. Such partnerships need to ensure quality and equity in access to ICT services. Development cooperation, with clear sustainability strategies and with a focus on human resource development, could also help countries achieve adequate connectivity to expand digital teaching and learning.

Increase investment in digital skills for teachers and other education personnel

Developing the digital capability and skills of teachers is key to preparing students for the needs of changing societies and economies. This will require improving the quality of initial and continuing teacher training and development and enhancing supports for lifelong learning. Such training should cover use of technology, pedagogy and content knowledge, and ethics, safety and well-being in relation to digital technologies. Training and professional development need to be affordable and accessible to all teachers, and should take into account gender and rural/urban dynamics.

Commit to decent work for teachers and other education personnel

Decent work is a means for attracting and retaining teachers and ensuring provision of quality education. Without fair wages, safe and healthy working conditions and job security for teachers, efforts to effectively implement digitalization strategies in education can be compromised. Digitalization strategies, policies

and frameworks should take into account their effects on the work of teachers, including hours of work, workload, stress and occupational safety and health.

Strengthen social dialogue

Constructive social dialogue commits all parties, namely governments and employers' and workers' organizations, to meaningful involvement in digitalization efforts. Social dialogue can enhance the formulation and implementation of policies, address longstanding and emerging challenges and further advance decent work. It should be regular and should include all areas of work affected by digitalization in education.

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