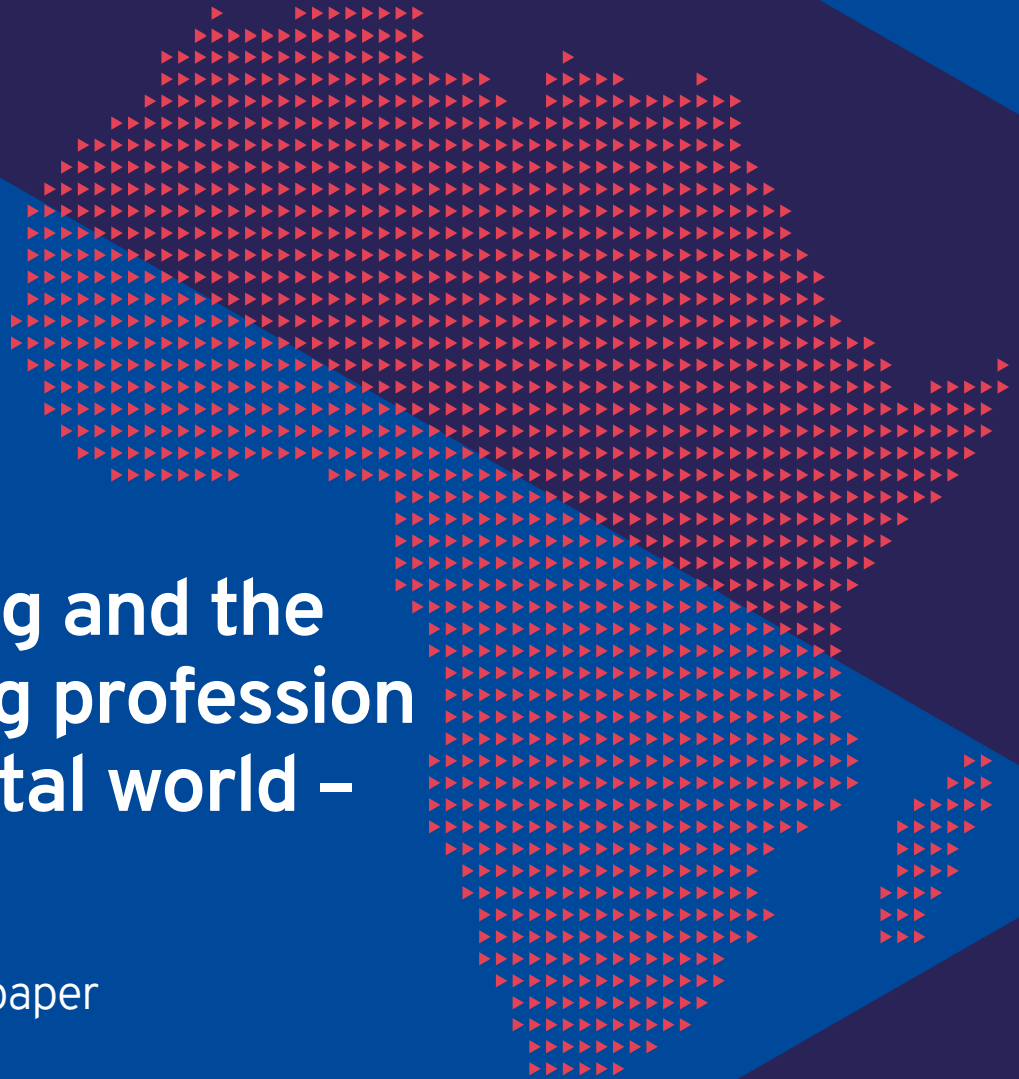




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► Teaching and the teaching profession in a digital world – Zambia

Background paper

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Abbreviations

7NDP	Seventh National Development Plan
CPD	continuous professional development
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICT	information and communication technology
IDI	ICT Development Index
ILO	International Labour Organization
IT	information technology
NGO	non-governmental organization
NRI	Network Readiness Index
ODFL	Open, Distance and Flexible Learning
OER	Open Educational Resources
PTR	pupil-teacher ratio
SPTP	Standards of Practice for the Teaching Profession
TEVET	Technical Education, Vocational and Entrepreneurship Training
TEVETA	Technical Education, Vocational and Entrepreneurship Training Authority
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
ZAMTEL	Zambia Telecommunications Company Limited
ZEEP	Zambia Education Enhancement Project
ZICTA	Zambia Information and Communications Technology Authority
ZNUT	Zambia National Union of Teachers

► 1. Key findings

This study has been undertaken to provide insight into the state of digitalization in the education system in Zambia at the primary and secondary school levels and in technical education, vocational and entrepreneurship training (TEVET). In particular, the study investigates the integration of information and communication technology (ICT) in education, including the related challenges and strategies, as well as the impact of the COVID-19 pandemic on digitalization efforts. The study examines the significance of gender in relation to digitalization in education prior to, during and beyond the pandemic. Some of the key findings of the study include:

- The National Education Policy of 1996 was the first official policy to provide guidance on the articulation of ICT in education. The National ICT Policy 2006 (as well as the revised, but yet to be launched, National ICT Policy 2021) recognizes the importance of enhancing digital skills, and the Seventh National Development Plan (7NDP) 2017-21 supports further enhancement of the role of ICT in education.
- Responsibility for ICT policy and regulation in the education sector is shared between various ministries/agencies/units, making it difficult to follow up implementation (PMRC, 2020). The Ministry of Education directs policies, plans and strategies for the integration of ICT in public and parastatal institutions through various government units and departments. The Zambia Information and Communications Technology Authority (ZICTA) oversees ICT regulations, standards and guidelines throughout the country. ICT policy and regulation in education is not therefore wholly owned by one specific unit.
- The current state of ICT infrastructure in Zambia is low (key informant interviews, 2021; Dutta and Lanvin, 2020; ZICTA, 2018). This is reflected in the low level of ICT adoption in the education sector at the primary, secondary and TEVET levels.
- In some secondary schools, computer studies are compulsory in Grades 8 and 9. However, the student-teacher ratio in some schools and regions is high, with as many as 700 students per teacher, and sometimes insufficient numbers of teachers are equipped and trained to use ICT in the classroom. In cases where computer studies are not offered as a compulsory subject, including for senior classes (Grades 10 to 12), this is mostly due to inadequate resources and teaching staff (key informant interviews, 2021).
- There is an observed need for ICT teachers in most schools in rural and urban areas of the Copperbelt region in Zambia (ZICTA, 2018; key informant interviews, 2021). Key informants from a Teacher Training College in the Copperbelt Province and TEVET colleges in the Copperbelt Province, North-Western Province and Lusaka Province also report a lack of ICT teachers (key informant interviews, 2021).

- ▶ Among the key informants interviewed from six TEVET colleges, reference was made to regional and institutional ICT policies, ICT strategies and Open, Distance and Flexible Learning (ODFL) policies as key frameworks to support the integration of ICT in teaching and learning.
- ▶ Some of the key challenges to ICT integration in education include: insufficient ICT infrastructure; the lack of ICT personnel among teachers and skilled support staff; low bandwidth; the lack of and poor internet connectivity; the lack of smart devices; low digital literacy among teachers and learners; overworked information technology (IT) teachers; the lack of power; the poor attitude to ICT in education; resistance from students to learning to use technology; the use of traditional assessments; and poor or inadequate guidance by parents on the use of smartphones for learning. Rural schools are more severely affected by many of these challenges (key informant interviews, 2021; World Bank, 2020; PMRC, 2020).
- ▶ The COVID-19 pandemic has had various impacts on the education community. Challenges were amplified and cases of the loss of both teaching and learning time were reported at all levels (key informant interviews, 2021).
- ▶ During the pandemic, the Ministry of Education introduced a virtual learning platform – NotesMaster – in some junior schools (Grades 8 and 9) and provided training for some ICT trainers on the e-learning platform. However, only a few teachers were able to participate. The Government is working to increase bandwidth and upgrade ICT infrastructure in rural schools and colleges (key informant interviews, 2021).
- ▶ Several activities aligned with digitalization in education have been noted in some schools and colleges, such as: conducting online examinations; engaging stakeholders to support the equipment of computer laboratories; encouraging learners to bring their own devices to class; providing continuous professional development (CPD) for teachers on the use of ICT; providing students with opportunities to develop digital literacy; supplying internet connectivity for teachers in schools; and making use of Massive Open Online Courses (MOOCs) and Open Educational Resources (OERs) (key informant interviews, 2021).
- ▶ These findings point to the need for concerted efforts from all stakeholders to improve the teaching and learning environment and address the observed shortfalls in ICT infrastructure and skills. To support these efforts, an enabling environment must be created through policy and regulation.

► 2. Introduction

Zambia became independent from British colonial rule in 1964. It has a population of approximately 18 million, mostly comprising youths, as the majority of the population are under the age of 18.¹ Although the country has made significant strides in increasing enrolment in education, many barriers continue to inhibit the participation of all children in school learning. Prior to the COVID-19 pandemic, it was reported that 800,000 school-aged children were out of school (Lusaka Times, 2019). During the COVID-19 pandemic, the Government adopted distance learning mechanisms to continue learning during school closures. However, the lack of access to devices, internet and electricity affected access to learning, particularly in rural and remote areas and among lower-income households (World Vision, 2020).

Zambia Vision 2030 recognizes the importance of investing in ICT infrastructure and services and enhancing capacities with a view to developing an enabling environment for sustainable socio-economic development (Government of the Republic of Zambia, 2006). This vision is supported by the revised, but yet to be launched, National ICT Policy 2021 and the Seventh National Development Plan (7NDP) 2017-21. Despite these policies, more concerted efforts are needed from all stakeholders to improve the quality of education and address challenges relating to ICT infrastructure and skills.

This study examines the state of digitalization in the Zambian education system, focusing on primary, secondary and TEVET institutions. The study first provides a brief overview of the education sector in Zambia and highlights the various challenges and issues currently faced by the country. This is followed by a discussion of the policies and other frameworks that support digitalization in education and the key challenges and initiatives for the integration of digital technologies in teaching and learning. The study then provides an introduction to some of the key education sector stakeholders and their insights into the priority of and challenges to digitalization in education. The impact of the COVID-19 pandemic on education and the responses to the pandemic, particularly in relation to the use of technology for teaching and learning, are also highlighted. The study concludes with recommendations to enhance the use of digital technology in education.

¹ UNICEF, [Children in Zambia](#).

► 3. Methodology

The study used a mixed methodology approach, which included document analysis and semi-structured interviews. The document analysis involved a review of secondary material obtained from international and local studies, research reports and policy documents. The literature review allowed the researchers to identify relevant information and data in relation to, among other factors, the adoption of ICT in education, access to infrastructure and devices and teacher training and development in Zambia and Africa. Some sources and reports were produced by international organizations, such as the International Labour Organization (ILO), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Bank, and others by local institutions. Comparative studies relating to ICT and its use by teachers and school administrators in primary, secondary and TEVET schools were also used, especially to understand the policies and practices that are being adopted in other countries. All the literature consulted has been published over the past ten years.

Semi-structured interviews allowed the researchers to answer the 'how', 'why' and 'what' questions in relation to digitalization in education in Zambia. Key informants were identified from various education stakeholder groups, preferably heads of institutions or senior members of staff with a broad knowledge of their respective institutions. The research team conducted twelve interviews, including with informants from the Ministry of Education, primary and secondary school heads and administrators, TEVET college principals and administrators, and a teachers' union official. In addition to discussing challenges, strategies and initiatives for digitalization in education, key focus areas included: the level and type of ICT infrastructure in education; the availability and use of hardware, software, infrastructure and tools; the level of teachers' skills and the availability and frequency of teacher training and development; the availability of funding; and the relevance of the curriculum.

Permission to conduct the interviews was obtained from the Ministry of Education and the Ministry of Technology and Science, which oversees TEVET institutions. Key informants were provided with informed consent forms prior to the interviews. Detailed notes were kept of the interviews with a view to the extraction and analysis of relevant information. The interviews lasted around 35 to 40 minutes and were conducted face-to-face, over the telephone or through video conferencing. The field work took longer than expected due to the various levels of authorization required. Furthermore, due to the sensitivity of some information, it was necessary for the first contact with an institution to be face-to-face.

► 4. Brief overview of the education sector

4.1. Zambia education system

4.1.1. General education

Zambia's education system includes both public and private schools, as well as grant-aided and community schools, which are run by communities with some support from the Government. The Government is the main provider of education in the country, with some 62 per cent of schools in the public system. Grant-aided schools account for 3 per cent of schools and community schools for 25 per cent. As the country is predominantly rural, there are more schools in rural than in urban areas, with 81.2 per cent of primary schools and 58.1 per cent of secondary schools located in rural areas (BETUZ, 2017).

In 2019, there were 9,282 primary schools and 1,288 secondary schools, representing an increase of 5 per cent in the number of primary schools and 15.3 per cent for secondary schools over the previous year. The increase in the number of secondary schools is due to the upgrading of some primary schools to secondary schools in all provinces. The Zambia Education Enhancement Project (ZEEP), a World Bank-funded project running until 2025, has resulted in 82 primary schools being upgraded to secondary schools. There was an aggregate increase of 'Government of the Republic of Zambia/Government-aided' secondary schools from 908 schools in 2018 to 1,144 in 2019, an increase of 14.9 per cent. In part, this was due the upgrading of over 220 primary schools into secondary schools, as well as the improvement in the response rate of schools to the 2019 census (Ministry of General Education, 2020, 2019).²

In 2019, a total of 3,382,087 students were enrolled in primary school and 918,912 in secondary school. There were 80,919 teachers in primary schools and 33,882 in secondary schools. The pupil-teacher ratio (PTR) was 1:59.4 in primary school and 1:29.7 in secondary school (Ministry of General Education, 2020). The PTR in primary schools is high, which can negatively affect learning. Digitalization may provide a solution to address this challenge by reinforcing learning during and outside the classroom through personalized and 'flipped' learning (that is, when learners go through the materials to be covered in class beforehand).

The mandate of the Ministry of Education is to formulate and implement general and higher education policies, set and enforce standards and regulations, licence, supervise and provide education and skills development. In addition, the Ministry of Education is responsible for

² In 2021, with the election of the new government, the Ministry of General Education became the Ministry of Education. References in this study make use of the former title to reflect authorship at the time of publication.

the registration and inspection of schools and colleges of education. The schools covered include public, private and community schools. The Provincial Education Offices in the ten provinces oversee the implementation of education policies at the provincial level.³

Education begins with pre-school education, which is optional. Formal primary education consists of Grades 1 to 7, followed by two years of junior secondary education and three years of senior secondary education. In Zambia, the net enrolment rate is 87.9 per cent in primary school and 42.9 per cent in secondary school. Zambia has almost achieved universal primary school completion, with a completion rate of 91.8 per cent in Grade 7, according to national statistics. However, there are considerable disparities between regions. For example, the northern region reports an 81.3 per cent completion rate, while the figure for Lusaka is 78.6 per cent. Girls are particularly disadvantaged, with many dropping out at the upper primary and secondary levels. Transition levels of girls to the junior secondary and senior secondary levels continue to be quite low (UNICEF, n.d.).

The transition rate from primary to secondary school remains low at 67.5 per cent for several reasons, including: the lack of places in secondary schools for all those leaving primary school; school fees, which are introduced in Grade 8, and other costs related to education; and the long distances to secondary schools. For girls, the lack of menstrual hygiene facilities, the low value placed on girls' education by some communities, teenage pregnancy and child marriage are other barriers that inhibit their meaningful participation in secondary education (UNICEF, n.d.).

Although education is a priority focus of national development plans and strategies, quality continues to be a challenge. Achievement targets have not been met. For example, the target of an average score of 40 per cent in language and mathematics has not been reached in Grades 5 or 9. Moreover, the number of children passing Grade 9 and 12 examinations is low, at 55.3 and 64.8 per cent, respectively (UNICEF, n.d.).

4.1.2. Technical Education, Vocational and Entrepreneurship Training

The Ministry of Technology and Science, previously entitled the Ministry of Higher Education, was established in August 2021 and is responsible for coordinating the TEVET sector. Through the Department of Vocational Education and Training, the Ministry is responsible for policy formulation and the coordination and promotion of TEVET by establishing guidelines for all TEVET providers. The Department of Vocational Education and Training is also responsible for increasing stakeholder participation in the provision of TEVET and assessing the impact of TEVET programmes.⁴

³ For more information, see [website](#) of the Ministry of General Education, accessed 20 February 2022.

⁴ For more information, see [website](#) of the Ministry of Higher Education, accessed 20 February 2022.

As of June 2021, a total of 308 TEVET institutions were registered with the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA).⁵ Most of the institutions are in Lusaka, Copperbelt and Southern Provinces. There are 122 TEVET institutions in Lusaka Province (39.6 per cent), 78 in Copperbelt Province (25.3 per cent) and 29 in Southern Province (9.4 per cent). These three provinces (out of ten in total) account for 74.3 per cent of the total number of TEVET institutions, which illustrates the challenges in access to skills training faced in other provinces and rural areas. In terms of ownership, 37.3 per cent of the institutions are Government/public-owned, 26.9 per cent are private-owned and 14.9 are church-owned (TEVETA, 2021). The remaining institutions are owned by the Community Trust Company and non-governmental organizations (NGOs).

In terms of quality, TEVETA classifies institutions into three grades, from 1 to 3. The largest number of institutions (62.3 per cent) are classified as Grade 3, the lowest level. Only 7.8 per cent of institutions are classified as Grade 1, the highest level, and 29.9 per cent are classified as Grade 2 (TEVETA, 2021). This means that skills training faces several challenges, which need to be addressed to ensure the provision of quality TEVET. According to the 2020 National TEVET Policy, these challenges include “poor infrastructure, inadequate and inappropriate tools and equipment, limited teaching and learning materials and insufficient qualified and experienced trainers and poor working conditions of service staff in the TEVET sector. In addition, there are inadequate capacities at management and supervisory levels to effectively and efficiently develop and implement the quality assurance systems in the training institutions” (Government of the Republic of Zambia, 2020, p. 3-4). There is a very broad difference in the number of TEVET institutions, compared with the number of secondary schools in the country, giving rise to challenges of access to skills training for students who complete Grades 9 and 12.

The TEVET sector offers short courses (22.4 per cent), level three certificate (43.2 per cent), level four certificate (14.6 per cent), level five certificate (1.9 per cent) and diploma (17.8 per cent) programmes (TEVETA, 2021). The 2020 National TEVET Policy proposes a TEVET system that goes up to Master’s level. The 2020 National TEVET Policy is a revised version of the 1996 Policy, which has been adjusted in recognition that highly skilled and competent citizens will be required to achieve Zambia Vision 2030 (Government of the Republic of Zambia, 2020).

4.2. The teaching profession

The Teaching Profession Act No. 5 of 2013 establishes and defines the functions of the Teaching Council of Zambia (hereinafter referred to as “the Council”). The establishment of the Council was a key step towards the realization of the national aspiration to attain

⁵ In addition to registering institutions, TEVETA, among many other functions, is responsible for developing national curricula in consultation with all stakeholders and for setting minimum standards and qualifications for occupations, skills, technologies and trades for institutions in accordance with developments in industry (TEVETA, 2021).

high standard and productive education through a disciplined, dedicated, competent and dependable teaching profession. The Council's mandate includes the regulation of teachers, their practice and professional conduct, and the accreditation and regulation of colleges of education. It is also mandated to regulate CPD and collaborate with relevant teachers' unions on conditions of service and remuneration. Its composition includes representatives of the ministry responsible for education and vocational and entrepreneurship training, public, private and community education institutions and recognized teachers' unions.

In 2019, the Council, in collaboration with UNESCO, developed and implemented the Standards of Practice for the Teaching Profession (SPTP). The SPTP outlines the expected knowledge, skills, values, conduct and obligations of teachers, teacher educators and education leaders, and will act as the basis for appraisal, licensing, promotion, inspection and the award of teaching certificates (UNESCO, 2019). As part of the SPTP, teachers, teacher educators and education leaders are issued a license to practice by the Council every three years when they meet the credit points set out in the Continuous Professional Development Regulatory Policy. Practitioners are awarded credit points, based on the CPD completed, which constitute the basis for license renewal. The SPTP is being converted into an online course, which will allow practitioners to train on its content, be assessed and awarded credit points (Government of the Republic of Zambia, 2019a). The digitalization of the SPTP is being undertaken by the Council, with support from UNESCO and technical assistance from the Technical and Vocational Teachers' College and the Charles Lwanga College of Education, which are centres of excellence for ICT in teacher education (under the Ministry of Education).

The SPTP specifies six areas of practice:

- ▶ culture
- ▶ teaching and learning
- ▶ management (classroom for a teacher, learning environment for a teacher educator and institutional for an educational leader)
- ▶ partnership and networking
- ▶ professional improvement
- ▶ research

Within each area of practice, several standards are outlined for teachers, teacher educators and educational leaders. Inspectors visit institutions to inspect and ensure compliance with standards, on the basis of which it is determined whether a license to practice will be issued or revoked (Government of the Republic of Zambia, 2019b).

To qualify to teach in primary education, a teacher needs to have a primary teacher's diploma. For secondary education, the requirement is a teacher's diploma or a bachelors' degree. Degree qualifications are obtained through public and private colleges/universities, while diploma qualifications are normally obtained in colleges of education (both public and private), which are registered by the Ministry of Education. The total number of 114,801 teachers reported in 2019 represented an increase of 7,311 over the 107,490 recorded in 2018. There were 80,919 primary school teachers and 33,882 secondary school teachers. In terms of qualifications, a total of 52,221 teachers had a primary or secondary teacher diploma, 2,583 had an early childhood diploma, 21,585 had a bachelor's degree in education and 1,211 had a Master's degree (Ministry of General Education, 2020).

► 5. Digitalization in education

5.1. Defining digitization, digitalization and digital transformation

The terms digitization, digitalization and digital transformation are used in a number of studies. Although they are often conflated, according to Gupta (2020), they involve different, but related processes. *Digitization* consists of constructing a digital representation of physical, non-digital objects. *Digitalization* involves making use of digital technologies and digitized data to enable or improve processes. It refers to the use of computers, mobile phones, software applications, the internet and other types of technology to support learning practice (Kituyi and Tusubira, 2013). *Digital transformation* refers to change processes enabled by or because of digitalization (Gupta, 2020). The present study draws on these definitions to investigate digitalization in the education sector in Zambia.

5.2. Global research and recommendations on digitalization in education

To address issues of quality, access and efficiency, the education and training sectors globally, as well as in Zambia, have embraced digitalization. Several studies have focused on the advent of ICT in the education sector over the past decade. In primary, secondary and tertiary institutions, the integration of ICT is among the key issues facing policy-makers (Pettersson, 2020; Kaur, 2019; Ng, 2015). The digitalization of education, according to Kaur (2019), can help mitigate education challenges, such as archaic teaching methods, teacher shortages, highly disproportionate student-teacher ratios and inadequate teaching materials. It makes it possible for one teacher to deliver information remotely to several locations.

However, the COVID-19 pandemic and other research challenge the notion that technology can overcome issues of cost, teacher shortages, decent work deficits and education access and quality. According to a recent ILO study (2021a, p. 10-11), "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 access to resources, rather than act as a replacement."

The incorporation of digital technologies in education can support learning, the development of twenty-first century skills, digital citizenship and lifelong learning (Ng, 2015). However, as noted by Pettersson (2020), digitalization processes are often limited to the implementation of digital technologies, without pedagogical and organizational change. This is the case

in Zambia, where there has been much discussion about using technology in education, without much focus on issues of pedagogy and organizational change (key informant interviews, 2021)

Digitalization in education not only affects teachers and learners, but also other education stakeholders who play an important role in the integration of ICT in teaching and learning. As such, it is necessary to invest in ICT skills and knowledge to achieve meaningful change (Munyengabe et al., 2017; Ng, 2015). Ghavifekr and Wan Rosdy (2015), who investigated teachers' perceptions of the effectiveness of ICT integration in the teaching and learning process in Malaysia, indicate that one of the main success factors in technology-based teaching and learning is well-equipped and prepared teachers. They found that professional development training for teachers plays an essential role in enhancing the quality of students' learning. Similarly, a study of early career teachers in Germany emphasizes the need to develop teacher competence in ICT-related teaching and learning in initial and continuous teacher training and development to ensure student learning during crisis situations, such as the COVID-19 pandemic (König, Jäger-Biela and Glutsch, 2020).

In addition to investing in teachers' skills and competences, other major barriers need to be addressed, including: the lack of genuine software; limited devices and equipment in the classroom; low internet connectivity; the lack of affordable technology, technology-related services and data and internet bundles; resistance by both teachers and students to the use of ICT, including uncertainty about the benefits of using ICT for teaching and learning; the unavailability of the latest ICT equipment; the lack of expert technical staff; outdated curricula; and insufficient time to learn about new ICT (ILO, 2021a; Munyengabe et al., 2017; Mathevula and Uwizeyimana, 2014). Many of these challenges are also present in Zambia, as noted below.

In 2015, the Commonwealth Education Hub convened a two-week e-discussion on the key issues and challenges of integrating ICT tools in education systems. The discussion identified several recommendations in support of the use of ICT for learning (see box 1). Some of these recommendations are echoed in a recent ILO study (2021a), which outlines some key measures for countries to consider when undertaking their own digital transformations, including: developing comprehensive and forward-looking policies to support digitalization in education; increasing investment in digital technology and infrastructure in schools and for distance learning; increasing investment in digital skills for teachers; committing to decent work for teachers; and strengthening social dialogue.

Box 1. Key recommendations for ICT integration in education

- ▶ Increase broadband access for education to enable ICT integration for teaching and learning;
- ▶ Review ICT in education policies in light of technological advances;
- ▶ Support ICT in education policies with clear implementation plans, backed by sufficient political will and funding;
- ▶ Establish monitoring and evaluation mechanisms at the national and institutional levels to assess ICT in education initiatives;
- ▶ Provide CPD to teachers and academics in ICT integration for teaching and learning.

Source: The Commonwealth Education Hub, 2015.

It is vital to consider gender in discussions of ICT integration and skills development in education. In 2005, the United Nations highlighted the importance of: mainstreaming and monitoring the gender perspective in all ICT initiatives; collecting sex disaggregated data on the use of ICT; identifying and promoting good practices and lessons learned on the ways in which women and girls use ICT; and engaging in capacity-building for gender equality in education and employment (United Nations, 2005).

In the *Zambian National Gender Policy 2014*, education and skills development are recognized as playing a critical role in providing opportunities for employment, poverty reduction, productivity and personal growth. Some of the leading reasons for drop-outs among girls include pregnancies, child marriages, the lack of role models (particularly in rural areas), the low appreciation of the value of education by parents and children and poverty. According to the *National Gender Policy 2014*, equitable access to quality education and skills development is central to promoting gender equity and equality in society (Government of the Republic of Zambia, 2014). The *7NDP* also sees education as one of the key means of achieving gender equality. As such, the Government is committed to investing in education and skills development with a view to addressing gender disparities in participation rates and actively promoting the education of girls (Government of the Republic of Zambia, 2017).

► 6. Digitalization in education in Zambia

6.1. Status of digitalization in education

The Network Readiness Index (NRI), published by the World Economic Forum, measures the extent to which a country can make use of ICT to support competitiveness and well-being. The 2020 NRI was based on four pillars, which measured a range of indicators, including: the level of ICT access in terms of infrastructure and affordability; the use of technology by individuals, businesses and governments; government investment in technology; the regulatory frameworks in place to support participation in the network economy; and the social and economic impact of participating in the network economy. Zambia's NRI ranking in 2020 was 116 out of 134 countries. 'Internet access in schools' and 'households with Internet access' had rankings of 65 and 113, respectively. The 2020 NRI emphasizes the importance of education, and particularly lifelong learning, to ensure that individuals possess the skills needed for successful and sustainable digital transformation, as investment in technology alone will not guarantee success (Dutta and Lanvin, 2020). A similar observation is made in the 7NDP (Government of the Republic of Zambia, 2017).

The International Telecommunication Union (ITU) publishes the ICT Development Index (IDI), which is based on several ICT indicators, grouped under access, use and skills. In 2017, Zambia's IDI rank was 146th out of 176 countries (an improvement on 2016, when it was ranked 149th) (ITU, 2017). A recent World Bank (2020) digital economy diagnostic report found that Zambia has made significant progress in the last few years towards digital transformation, particularly in relation to digital infrastructure, digital financial services and digital platforms. However, more work needs to be done to ensure that the infrastructure is being used, including by addressing the prohibitive cost of connectivity for many Zambians.

To improve access to digital technologies for transformative purposes, the diagnostic report concludes that investments are needed to enhance the digital skills of individuals, businesses and the Government, an area in which Zambia has made the least progress. Most schools in Zambia are not connected to the internet and lack adequate access to devices. Furthermore, teachers have limited knowledge and skills for the integration of digital technologies into teaching and learning processes. The report recommends leveraging technology to improve teacher training and development, facilitate access to up-to-date educational resources and support education policy planning and monitoring and evaluation (World Bank, 2020).

Similar challenges have also been reported in TEVET. According to the 2020 National TEVET Policy, there is a mismatch between the technology available in TEVET institutions and the technology used in industry. Most of the technologies available in TEVET institutions are outdated. Although addressing the mismatch requires a regular review of the curricula, this

has been hindered by financing shortfalls. Other challenges include inadequately qualified trainers, the lack of appropriate teaching and learning materials and poorly equipped training institutions (Government of the Republic of Zambia, 2020). Although programmes on the integration of ICT in education in pre-service and in-service training are available (mainly from the Technical and Vocational Teachers' College), some teachers are not able to apply what they have learned in training due to the lack of ICT equipment in the schools/institutions where they teach or are posted to teach (key informant interview, 2021).

According to the 2017 Educational Statistical Bulletin, 5,580 schools (approximately 56 per cent), made up of 5,412 primary schools and 168 secondary schools, do not have any source of electricity. The Rural Electrification Authority is working on an initiative to electrify rural areas of the country, from which many schools are set to benefit. In terms of access to technology in schools, one computer is available for approximately every 119 children, with variations between provinces. Access to computer laboratories and internet connectivity are challenges in both primary and secondary schools. A total of 802 schools have access to internet facilities (514 primary schools and 288 secondary schools), most of which are in the Lusaka, Copperbelt and Southern provinces (Ministry of General Education, 2018a; World Bank, 2020).

These findings are supported by the information provided by key informants, who noted that the lack of infrastructure, high costs of acquiring and maintaining technology, the lack of teachers trained in digital skills and the resistance to adopting technology in their practice are some of the major barriers to the integration of digital technology in education. One of the key informants explained that some CPD activities have been taking place to support the capacity development of teachers and teacher trainers, but that the pace has not been good enough. The informants also noted that NGOs have supported the Government in the provision of ICT equipment and tools, and that international organizations and agencies have also been collaborating with the Government to improve the quality of education, including through the use of ICT for pedagogical purposes. Japan, through the Japan International Cooperation Agency (JICA), has been a key partner in the education sector in Zambia (key informant interviews, 2021).

As a way forward, one key informant recommended that students in schools and teacher training institutions should be given access to courses on ICT to enable them to interact with digital technology in a beneficial manner, thereby expanding their knowledge and skills. Teacher trainers should also be expected to expand their knowledge and skills in the use of ICT for teaching and learning (key informant interview, 2021). This is reflected in the ICT Teacher Competency Framework developed in 2018.

6.2. Initiatives to promote digitalization in education

During the 2021 National Budget Speech, the Minister of Finance said that the Government, as part of the Digital Transformation Agenda, would increase the number of communication towers in the country to support the use of technology and wider internet coverage, particularly in unserved and underserved areas. With a view to promoting human and social development, significant allocations were made to education and skills development in the national budget. There are also plans to recruit 30,000 teachers in 2022 to reduce the PTR and improve the quality of education (Government of the Republic of Zambia, 2021b).

In 2013, Zambia launched a process of curriculum revision from a content-based to a competency-based curriculum, with a view to preparing learners for a rapidly changing world and labour market. In 2015, Zambia introduced compulsory computer studies in the education curriculum for Grades 8 to 12 as part of the New Curriculum Framework and made efforts to facilitate access to computers in schools at all levels. However, as noted in the revised National ICT Policy 2021 (not yet launched), this was not supplemented with a programme to train ICT teachers (Government of the Republic of Zambia, 2021a). These findings are supported by key informant interviews (2021), which identified several challenges to teaching computer studies, including: the lack of qualified teachers to teach ICT and computer studies; the lack of or broken computers; the lack of electricity power supply and internet connectivity in schools; the lack of ICT policy to support the teaching of computer studies; and inadequate institutional capacity.

The Ministry of Education and the Ministry of Technology and Science have both entered into partnerships with several international organizations and agencies for the integration of technology into teaching and learning. Some of these initiatives include:

- ▶ The UNESCO-China Funds-in-Trust Project “Harnessing Technology for Quality Teacher Training in Africa” aimed at enhancing teacher education and training with a view to improving education equality in Zambia and other African countries. This involved equipping teacher educators, teachers and student teachers with 21st century skills. Two teacher training colleges participated in the project – the Charles Lwanga College of Education and the Technical and Vocational Teachers’ College. According to the Charles Lwanga College of Education (2020), through the project, the college was transformed into a Teacher Training ICT Centre of Excellence in the application of ICT as a pedagogical tool. Lecturers received training in online instruction, including through the use of Moodle (a learning management system), and the ICT infrastructure in the college was upgraded. The project has been approved for a second phase, which will focus on capacity building in the use of ICT for pedagogical purposes (starting in 2022).
- ▶ SchoolNet Zambia promotes the integration and use of ICT in teaching and learning in educational institutions by supporting the establishment of ICT facilities and the development of the technical and pedagogical capacities needed to use ICT in education. Since 1998, SchoolNet Zambia, with support from the Ministry of Education, Computer

Aid International (CAI) and SchoolNet Africa, has been providing refurbished computers at low cost to educational institutions and NGOs in Zambia (SchoolNet Africa, 2020).

- ▶ The Zambia Education Enhancement Project (ZEEP), a project funded by the World Bank running until 2025, seeks to improve the achievement of learning outcomes in science and mathematics, which are foundational skills for the attainment of digital skills. As part of the project, tailored teacher training is provided to equip teachers with subject knowledge and pedagogical skills. The project is also working to upgrade the Education Management Information System (EMIS) to strengthen education data management, analysis and use as a basis for evidence-based policy formulation (World Bank, 2020; Ministry of General Education, 2019).
- ▶ A national [e-Learning portal](#) and a [Smart Revision platform](#) were launched during the COVID-19 pandemic by the Zambia Telecommunications Company Limited (Zamtel), a Government-owned telecommunications service provider, the Examinations Council of Zambia and the Ministry of Education to ensure continued learning. Both portals/platforms provided supplementary and alternative learning resources for students during the pandemic. The e-Learning portal provides access for both students and teachers to educational resources, including e-books, specialized services and a virtual library. The Smart Revision platform provides resources for Grades 7, 9 and 12 to help students prepare for examinations. Both resources were free of charge during the COVID-19 lockdown. Learners are now required to subscribe to access the content and learning materials (Zamtel, n.d.).

Key informants in TEVET institutions were asked about the activities undertaken to improve the use of technology in teaching and learning. One informant noted that their institution was using e-platforms for teaching and learning and that it was conducting online examinations. Another noted that the African Development Bank had been approached to support the equipment of a computer laboratory, and that learners were encouraged to bring their own devices to use for learning in class. Other institutions are focusing on CPD for teachers (key informant interviews, 2021).

The same key informants were also asked about the policies, strategies and plans in place to support ICT integration in teaching and learning (see table 1).

Table 1. Policies, strategies and plans to support ICT integration

Institution	Policies, strategies and plans in place or being developed to support the integration of ICT
<i>COE.</i> A public college of education in Copperbelt Province offering teacher training programmes to over 1,000 students.	Policies are set by the Government. The college provides training to trainees for primary schools in Copperbelt Province. There is a policy to teach 'introduction to ICT' as a compulsory subject in all courses. The curriculum is designed by ministry ICT experts for all learners in the programmes.
<i>Sec. Sch.-1.</i> A co-educational Government-funded secondary school in Copperbelt Province offering academic programmes from Grades 8 to 12.	ICT is compulsory at junior secondary school level. ICT is an optional subject at the higher level. At the senior level, ICT is paired with design and technology. ICT is offered in both the academic and vocational training pathways (in which technical and vocational training subjects are offered).
<i>TEVET-1.</i> A public TEVET institution in Copperbelt Province offering vocational and teacher training programmes to approximately 800 students.	There is an ICT strategy for the institution which guides how digital teaching and learning is to be implemented.
<i>TEVET-2.</i> A public TEVET institution in North-Western Province mainly offering engineering programmes at the trade test and craft levels.	The institute has an institutional ODFL Policy which describes how the curriculum should be implemented.
<i>TEVET-3.</i> A public TEVET institution in Copperbelt Province offering technical and vocational teacher training programmes.	ICT policies have been developed. Meaningful investments in ICT are in place. CPD is a high priority to ensure that teaching staff cope with rapidly changing technologies.
<i>TEVET-4.</i> A public TEVET institution in Lusaka Province offering mainly engineering programmes at trade test and craft levels.	Plans to generate a vision on the integration of ICT in education.
<i>TEVET-5.</i> A private TEVET institution of learning in Copperbelt Province offering teacher training programmes to about 129 students.	There is an ICT strategy for the institution, which guides how digitalization is to be implemented. However, implementation was undesirable for online lessons, as most instructors lacked technical training.
<i>TEVET-6.</i> A private TEVET institution in Lusaka Province offering vocational training programmes.	Has a regional strategy on digitalization.

6.3. Relevant regulatory and policy frameworks

Zambia Vision 2030 outlines a long-term plan for the country to attain middle-income status by 2030. Investing in ICT infrastructure and services and enhancing capacities are recognized as key to creating an enabling environment for sustainable socio-economic development. Similarly, education and skills development, including lifelong learning and training, are seen as essential to address inequalities and inequities and prepare youth for the labour market (Government of the Republic of Zambia, 2006).

The national development plans seek to operationalize Zambia Vision 2030. The strategic areas of the latest plan (7NDP 2017-21) include: strengthening the legal framework for ICT; improving ICT infrastructure for service delivery; facilitating ICT upskilling for public service workers; mainstreaming ICT in education curricula; and enhancing access to quality, equitable and inclusive education and skills training. The 7NDP notes that ICT infrastructure in the country is inadequate and fragmented, which is compounded by the lack of a supportive legal and institutional framework for the development and utilization of ICT. Special attention will therefore be given to procuring and supplying learning and teaching materials, including ICT for schools, as well as upgrading teachers' competences. The 7NDP recognizes that lifelong learning and CPD are key to building individual capacities and achieving gender equality (Government of the Republic of Zambia, 2017). The 7NDP Implementation Plan 2017-21 acts as a framework to guide the implementation of 7NDP.

Zambia has several policies that support ICT integration and internet usage in the country, including the revised, although yet to be launched, National ICT Policy 2021, which recognizes that a well-established, competitive and inclusive ICT sector can support the efficient provision of social services, such as education. It further highlights the importance of digital skills for social inclusivity, access to services, such as e-government, and the safe and critical consumption of information online. The National ICT Policy also notes that use of digital platforms, including for education, is limited in the country due to low smart phone penetration, poor digital skills among the population, low uptake of internet services as well as gaps in physical infrastructure (Government of the Republic of Zambia, 2021a, p. 10).

Some of the key measures to achieve the objectives of the revised National ICT Policy 2021 include: making ICT products and services more inclusive and accessible; enhancing the use of digital platforms; building confidence, trust and security in the use of ICT; promoting the efficient deployment of ICT infrastructure; improving digital literacy (including through inter-sectoral coordination in the deployment and inclusive use of ICT in education systems); and enhancing the legal and regulatory framework (Government of the Republic of Zambia, 2021a). These measures will have an impact on how education is delivered and what is delivered, as well as its digitalization efforts.

In Zambia, the key policies in the education sector include the National Policy on Education 1996, the National TVET Policy 2020 and the National Higher Education Policy 2019.

The National TEVET Policy 2020 and the National Higher Education Policy 2019 include digitalization strategies for their respective sub-sectors. As part of its objective to promote the quality and relevance of TEVET, the National TEVET Policy 2020 outlines the following policy measures:

- ▶ develop and implement diversified curricula that are responsive to national, regional and international needs;
- ▶ develop a human resources development strategy for lecturers in TEVET institutions;
- ▶ enhance mechanisms for monitoring quality in TEVET;
- ▶ facilitate the provision of modern tools and equipment to TEVET institutions;
- ▶ facilitate connectivity and the use of ICT in all colleges and trade training institutes;
- ▶ mainstream the use of ICT at all levels of TEVET;
- ▶ establish centres of excellence in TEVET;
- ▶ establish innovation and incubation hubs;
- ▶ promote the transfer of knowledge and skills from industrial clusters to TEVET institutions;
- ▶ facilitate the improvement of conditions of service for staff in TEVET (Government of the Republic of Zambia, 2020, p. 10).

The National TEVET Policy 2020 also notes that, although policy frameworks exist in the sub-sector and complement the provision of education and training, they are often conflicting or result in contradictions. This has led to a lack of synergy in the provision of skills training and has had a negative impact on the standardization of quality assurance (Government of the Republic of Zambia, 2020).

In addition to the policies referred to above, other policies guiding the development of digital skills include:

- ▶ the National Information and Communication Technology Policy, 2006
- ▶ the Electronic Communications and Transactions Act, 2009
- ▶ the Information and Communication Technologies Act, 2009
- ▶ the Digital Migration Policy, 2014
- ▶ the Science, Innovation and Technology Policy, 2019

There are plans to review the National Policy on Education 1996 so that it addresses emerging issues in education and society. Similarly, the National ICT Policy 2006 was revised in 2021, and is expected to be launched in 2022. Over the past 10 years, the Ministry of Education has consulted stakeholders on the development of a national e-learning strategy, an ICT in education policy and an open educational resources strategy. When finalized, these policies and strategies will support the improved provision of education at the early childhood, primary and secondary school levels, as well as the tertiary level.

The Zambia ICT Competency Framework for Teachers was developed in 2018 to support the ongoing professional development of teachers in the use of ICT for teaching and learning.

The Framework has three levels of increasing sophistication. It is anticipated that teachers will work their way through each level over time (Ministry of General Education, 2018b). Due to funding limitations, the Framework has not yet been operationalized. As part of its operationalization, a course will be developed on the Framework for teachers to use to enhance their skills and obtain credits for the renewal of their professional license.

6.4. Safe and critical use of digital technology

Several frameworks and models have been developed to support teachers in the use of digital technologies for teaching and learning, and to develop the digital skills of students. However, Falloon (2020) considers that a more holistic and broader-based approach and understanding is needed to recognize “the increasingly complex knowledge and skills young people need to function ethically, safely and productively in diverse, digitally mediated environments” (p. 2449). To a degree, this idea is also captured in the revised National ICT Policy 2021, which provides that “every effort shall be made to ensure that as the country adopts, implements and uses ICTs in all spheres of life, security measures are put in place to minimise negative impacts on society at large” (Government of the Republic of Zambia, 2021a).

It is vital not to overlook the ethical and critical dimensions of ICT use in education and society overall. According to the ILO (2021a), 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” (p. 11). Teachers, teacher trainers and education leaders need to be equipped with the requisite skills and knowledge to prepare students for the use of digital technologies in an ethical and critical manner. This issue needs to be addressed by policy-makers in Zambia.

► 7. COVID-19 and digitalization in education

In Zambia, the Ministry of Education developed the Education Contingency Plan for Novel Coronavirus (COVID-19), which put in place measures to ensure the continuity of learning during school closures. The internet enabled self-learning opportunities, while radio and television were used in an effort to reach all children, for example, by airing education programmes on national television. However, success was mixed. In some cases, it was found that teachers did not have appropriate skills to teach using television. Moreover, some students could not follow the programmes as their households did not have access to a television. For those with access to a television, some experienced erratic power supply due to electricity load-shedding (Zambia National Education Coalition, 2020).

A recent study on the preparedness of teachers for remote teaching during the COVID-19 pandemic in the Southern African Development Community (SADC), which includes Zambia, found that: limited preparation and training for emergency remote teaching was received by teachers; the training provided failed to include the provision of psycho-social support for students and teachers; and the majority of students from rural areas were excluded from remote teaching, including due to limited access to ICT tools and infrastructure, internet connectivity and electricity. As a result, some teachers and learners had little motivation and self-discipline to continue remote teaching and learning (Villet et al., 2020).

Nevertheless, according to the study, there was some online teaching through communication applications and platforms, such as WhatsApp, Moodle, Microsoft Teams, Zoom and Skype. Lessons were also broadcast on the radio and television and learning materials were uploaded on ministry or local websites. In addition, the pandemic resulted in more partnerships, both with local groups and international organizations, to improve training and ICT infrastructure and digitize teaching and learning content. The study proposed several recommendations for moving forward, including the development of a regional framework and/or strategy for the provision of education during crisis situations, focusing in particular on poor and marginalized students and their teachers (Villet et al., 2020).

Studies on the impact and the lessons learned from the COVID-19 pandemic are still being carried out and are very much needed. The present study therefore aims to contribute to the discussion with a view to enhancing understanding of the key issues affecting the teaching profession and the challenges and opportunities facing the various stakeholders. Key informant interviews (2021) revealed that the COVID-19 pandemic led to teaching staff adopting technology, whereas previously they had not been willing to do so. Lack of power and internet connectivity and limited ICT skills and competences were key obstacles in meeting the demand for teachers to connect with students and colleagues. Students in rural and remote areas were especially affected due to the lack of internet connectivity.

In the TEVET sub-sector, one key informant noted that the COVID-19 pandemic resulted in increased workload for IT staff who had to support others to navigate the technology. Another key informant in the sub-sector confirmed that the pandemic has resulted in a more flexible way of teaching using digital platforms, and considers that this flexibility will remain in the future. The creation of communities of practice was an approach adopted by one institution to exchange ideas and practices on how to continue teaching and learning during the pandemic. Lastly, one key informant indicated that the pandemic has shown that teachers require more experience with technology to boost their confidence (key informant interviews, 2021).

During the pandemic, one school administrator noted that reflexive ways of teaching were adopted, as well as new ways of teaching and learning through applications such as WhatsApp. The administrator added that the new ways of teaching and learning worked well for most teachers. Once schools re-opened, the re-organized school schedule required teachers to cover the syllabus faster, in one week rather than the usual three weeks (key informant interview, 2021).

The re-opening of schools produced another set of challenges. One key informant from a secondary school noted that it resulted in fears of exposure among staff, as well as being costly, as new sanitary equipment needed to be purchased. Although the Government supplied the masks, gloves needed to be purchased for teachers. Following the Ministry of Health safety guidelines resulted in increased working hours, as social distancing required an increase in the number of classes, with a consequent increase in teaching hours (key informant interviews, 2021).

More detailed responses from key informants in ten educational institutions in Lusaka, Copperbelt and North-Western Provinces are captured in table 2.

Table 2. Challenges to distance learning during the COVID-19 pandemic

Institution	Challenges to distance learning during COVID-19
<i>COE.</i> A public college of education in Copperbelt Province offering teacher training programmes to over 1,000 students.	One challenge is that teaching staff are over stretched for no extra pay. In many cases, teaching staff have such low skills that they must be assisted to type their assignments and operate a mouse. In some cases, teaching staff who have some IT skills have to maintain institutional computers due to the lack of dedicated IT support staff.
<i>Sec. Sch.- 1.</i> A co-educational Government-funded secondary school in Copperbelt Province offering academic programmes from Grades 8 to 12.	<p>We don't have enough teachers and computers. We could not hold lessons face-to-face due to the lockdown. We formed WhatsApp groups to send lessons to 1,700 students. Teachers would send the work to the parents' digital devices (phones or tablets). Parents would not communicate back to teachers. It wasn't easy to follow up the process. Some parents did not have smartphones so their children would miss out. The cost of internet bundles prevented participation.</p> <p>For NotesMaster (a virtual Learning Management System), we didn't have a chance to train due to the short notice. The Heads of Department would monitor the process of learning through WhatsApp. COVID-19 led to the closure of learning institutions when the pandemic had a high number of cases of transmission and deaths, leading to a loss of learning and teaching time. On the positive side, COVID-19 teaching has taught us to improvise. Most teachers have learnt to cover the syllabus in a shorter period.</p>
<i>Sec. Sch.- 2.</i> A girls Government-funded secondary school in Lusaka Province offering academic programmes from Grades 8 to 12.	Access by learners to digital devices is a challenge. Not many learners have access to digital devices. The computer ratio in the school is poor with 1 computer for 40 students. During the times that learners had to learn from home, it was a challenge for teachers to reach all learners in the class. In some cases, there was lack of contact with learners.
<i>TEVET-1.</i> A public TEVET institution in Copperbelt Province offering vocational and teacher training programmes to about 800 students.	Bandwidth is not large enough. Students at the hostels face challenges in accessing the internet. Students complained of lack of data bundles. Those working from home were not seriously affected as they are used to the challenge of the lack of internet. Digital skills and ICT knowledge are low among lecturers. Pedagogical skills gaps came out clearly during COVID-19, especially on the use of the Moodle Learning Management System, despite the training that some lecturers claimed to have. Some lecturers also had a poor attitude to the development of online materials.
<i>TEVET-2.</i> A public TEVET institution in North-Western Province offering mainly engineering programmes at trade test and craft levels.	The lack of smart devices for learners limited access to digital content. Also, the lack of internet connectivity and lack of electricity. Another challenge is the high cost of data bundles.
<i>TEVET-3.</i> A public TEVET institution in Copperbelt Province offering technical and vocational teacher training programmes.	Insufficient ICT infrastructure to cover teachers' and students' requirements. Poor digital literacy among some teachers and students. Failure to keep pace with fast evolving hardware and software applications. Increasing number of broken-down desktops and laptops. High cost of internet connectivity.

Institution	Challenges to distance learning during COVID-19
<i>TEVET-4.</i> A public TEVET institution in Lusaka Province offering mainly engineering programmes at trade test and craft levels.	Lack of finances for ICT acquisition. Lack of technology. No clear roadmap. Resistance to change. Poor internet connectivity.
<i>TEVET-5.</i> A private TEVET institution in Copperbelt Province offering teacher training programmes to about 129 students.	We don't have adequate ICT resources for lecturers and students. During the lockdown due to COVID-19, the institution closed completely. We could not offer any courses using online facilities as we are yet to prepare for this. Another challenge is that policies are not enforced, even though they exist.
<i>TEVET- 6.</i> A private TEVET institution in Lusaka Province offering vocational training programmes.	Cost of putting up infrastructure. The use of traditional assessments (physical exams) by TEVETA and resistance from students to use ICT in education.
<i>Pri. Sch.</i> A private co-educational primary and early childhood school in Lusaka Province.	Not all teachers have appropriate devices and some have no laptops.

The Ministry of Technology and Science, in partnership with the Commonwealth of Learning, organized an online course on how to facilitate online learning. The course provided training based on a trainer of trainers' model, where a small number of Technical and Vocational Teachers' College and the Ministry of Technology and Science staff were initially trained and are now teaching facilitators in 27 public institutions, making use of the Commonwealth of Learning's OERs on facilitating online courses. The facilitators are expected to train over 800 TEVET teachers in flexible skills development using OERs (Commonwealth of Learning, 2020). TEVET staff have also participated in webinars and online courses organized by the ILO, UNESCO and TVET Hamburg of Germany on various aspects of digitalization.

► 8. Status of social dialogue

In May 2021, the participants at an ILO Technical Meeting on the future of work in the education sector in the context of lifelong learning for all, skills, and the Decent Work Agenda (ILO, 2021b, para. 12) agreed that:

► Social dialogue based on the respect for freedom of association and the effective recognition of the right to collective bargaining has a crucial role in the establishment of education policies and in relation to working conditions of education personnel. Consultations, exchanges of information and other forms of dialogue between social partners and with government and other relevant actors are also important.

Although the Government has engaged in social dialogue in other sectors, meaningful social dialogue has yet to take place in the education sector on digitalization in education. Key stakeholders in the Zambian education system include the Ministry of Education, the Ministry of Technology and Science and the Zambia National Union of Teachers (ZNUT). ZNUT is the main teachers' union in the country and presides over the welfare of teachers in the civil service. Other teachers' unions in Zambia include the Secondary School Teacher's Union of Zambia (SESTUZ), the Basic Education Teachers Union of Zambia (BETUZ), the Professional Teachers Union of Zambia (PROTUZ), the National Union of Public and Private Educators of Zambia (NUPPEZ) and the United Teachers Union of Zambia (UNITUZ). There is a lot of fragmentation among teachers' unions in Zambia, as each union feels that it serves the interests of its members better. However, the unions have realized that there are advantages to having a united voice for teachers and are making plans to form one teachers' union (key informant interview, 2021).

An interview conducted with a key ZNUT official revealed that the ZNUT has worked with international partners to provide digital content to secondary school learners. The union official expressed satisfaction with the consultations between the Government, ZNUT and other stakeholders to ensure the continuation of learning during the COVID-19 pandemic, but emphasized that a key focus should be to ensure that teachers and learners from rural areas are included in digitalization efforts (key informant interview, 2021).

Private schools (mostly secondary) are represented by the Independent Schools Association of Zambia, which aims to:

- provide a forum for the discussion of matters of common interest;
- engage in any activities considered beneficial to the independent school movement in Zambia;

- ▶ enable member schools to seek corporate association with similar bodies in other countries; and
- ▶ provide a representative body that can be consulted by others outside the Association.⁶

Although the COVID-19 pandemic did not result in new policies in education, it led to certain changes in practice and new partnerships, for example with the private sector for the provision of IT support. Three institutions in Copperbelt Province have successfully engaged with the private sector to improve ICT conditions. In 2020, the Ministry of Education signed a Memorandum of Understanding with Zamtel to provide teachers and students with access to educational websites over the mobile network free of charge. Zamtel, in partnership with the Examinations Council of Zambia and the Ministry of Education, also launched a national e-learning portal and smart revision platform, which allowed students to access learning materials developed by Zambian teachers (Zamtel, n.d.).

⁶ For more information, see the [Independent Schools Association of Zambia](#).

► 9. Long-term projections

The education sector in Zambia needs to respond rapidly to the disparate ways in which ICT integration has been adopted. Many primary and secondary schools have lagged in terms of ICT acquisition and use. In addition to well-meaning policies, considerable practical training is needed to ensure meaningful transformation in the education sector. More specifically, there is a need to develop digital skills at all levels of learning in schools and colleges, and particularly among teachers, teacher trainers/educators, school leaders and other education personnel who will impart this knowledge to their students and communities.

TEVET institutions benefited from broad-scale capacity building for trainers during the COVID-19 pandemic. The TEVET sector has engaged with stakeholders, such as the Commonwealth of Learning, UNESCO, ILO and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) to build the capacity of TEVET staff. It is envisaged that in the future the Government, TEVETA and training institutions will provide more capacity-building programmes to improve the digital skills of teachers. Moreover, TEVETA is working on digitizing teaching and learning materials, which will be posted on the TEVETA learning platform as OERs (TEVETA, 2021). GIZ has also been working with actors in the TEVET sub-sector to develop curricula and digitalize training for some engineering and renewable energy programmes.

In the long-term, partnerships with the private sector have been identified as a way forward to ensure access to learning. In November 2021, UNICEF and Airtel Africa, a leading provider of telecommunications and mobile money services, announced a five-year pan-African partnership to support digital learning in schools by connecting schools to the internet and providing free access to learning platforms. Zambia will be one of 13 countries benefiting from the partnership (UNICEF, 2021).

Although there was a change of government in Zambia in August 2021 following the general election, it is planned to continue the operational policy of the previous government through the Ministry of Education. However, a new Ministry of Science and Technology has been established to reorganize emerging technologies and refocus the country to capitalize fully on the digital economy.

► 10. Ways forward

Based on an analysis of existing literature and data, as well as interviews with key informants from various institutions in the education sector, the following recommendations emerge as ways forward for more inclusive and equitable digitalization in education:

- Enact and enforce an ICT policy for the education sector to anchor and spearhead ICT integration in teaching and learning, with input and support from the various education sector stakeholders.
- Prioritize the enhancement of ICT infrastructure in educational institutions and other focal points across the country, such as libraries and post offices. This requires the provision of adequate bandwidth in all regions of the country, and the improvement of financing to support the acquisition and maintenance of technology in educational institutions.
- Improve power supply and internet connectivity, including through the provision of alternate power supplies, such as solar energy.
- Develop and improve effective public-private partnerships to support access to ICT devices and infrastructure, and therefore the development of appropriate ICT skills and competences across the country.
- Build the capacity of teachers, teacher trainers, education leaders and other education workers in the use of digital technology for teaching and learning, including through CPD activities.
- Make ICT courses compulsory in lower grades to support the early development of ICT skills and competences, and promote the ethical and critical use of digital technology at all levels of the education system.
- Establish an ICT unit within the Ministry of Education to implement, manage and monitor the use of ICT in educational institutions. This will encourage the development of measures to improve the PTR and the quality of education, especially in rural areas.
- Promote flexible and blended learning in schools and TEVET colleges, both during times of crisis and in normal times. During normal times, the appropriate use of ICT can enable teachers to reach out to students who are not able to attend lessons for various reasons. Educational technologies can and should be used to enrich the teaching of students through distance learning programmes.

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