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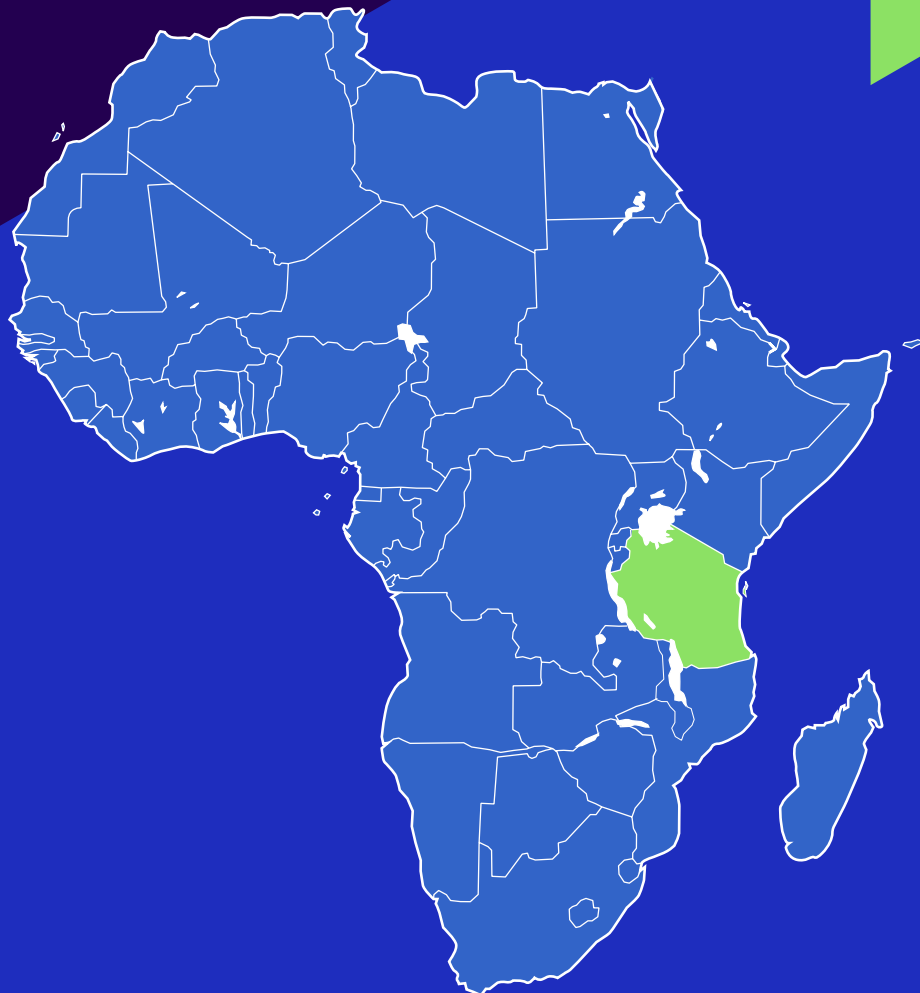
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Zusammenarbeit (GIZ) GmbH

Background report

▶ Digitalization in teaching and education in the United Republic of Tanzania

*Digitalization, the future of work
and the teaching profession project*

Patrick Renatus Manyengo



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With financial support from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of Federal Ministry for Economic Cooperation and Development (BMZ).

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First published 2021

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Graphic and typographic design, layout and composition,
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Code: JMB-REP

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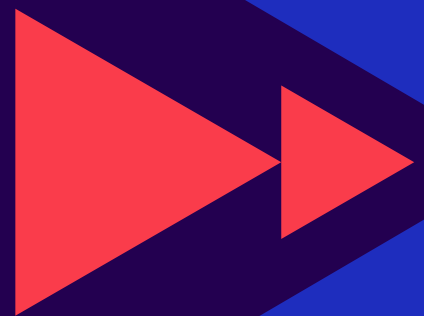
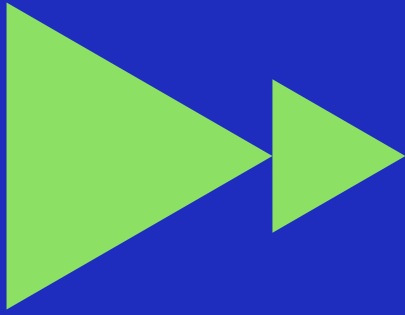
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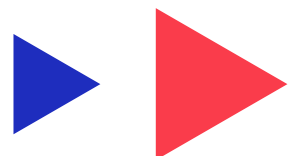
▶ CPD	continuous professional development
▶ EMIS	Education Management Information System
▶ ICT	information and communication technology
▶ PTR	pupil-qualified teacher ratio
▶ PRem	Primary Records Manager
▶ SIS	School Information System
▶ TGTS	Tanzania Government Teachers Salary
▶ TTU	Tanzania Teachers' Union
▶ TVET	technical and vocational education and training



▶ 1. Key findings

The study revealed, through consultations with stakeholders, a literature review and an analysis of relevant policies and initiatives, that although technology is playing a greater role in the social and economic spheres of the United Republic of Tanzania, additional efforts are needed to integrate technology in the education sector. Existing policies and frameworks support the use of technology for teaching and learning; however, some of these policies require updating and others further implementation. Some of the challenges to integrating technology for teaching and learning include: inadequate teacher training for digital skills development; lack of access to digital facilities and technology in schools and at home; and low internet and power connectivity in some schools and regions.

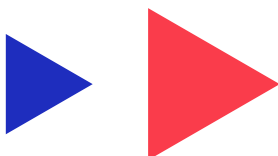
Education stakeholders play complementary roles in maximizing the benefits of digital technologies and advancing technology-based initiatives. The government, employers' representatives, teachers' unions and other education stakeholders need to collaborate toward effective integration of digital technologies in classrooms, including by developing the capacity of teachers.



▶ 2. Introduction

With labour markets increasingly requiring skills in the use of digital technologies, the education sector has become the focal point for preparing students for this changing context. The Tanzanian Government recognizes the potential of digital technologies to improve education delivery and quality as well as teacher training, and to contribute to student capacities and preparedness for a changing world of work. In light of this, the government introduced the first National Information and Communications Technology (ICT) Policy in 2003 to support the adoption of digital technologies in the education sector. As a result, ICT is taught as a subject at various school levels and is used to assist both teaching and learning. Teachers trained in the pedagogical use of technologies are essential to realizing the benefits of technology for quality education.

This study highlights the current status of, gaps in and opportunities for the use of digital technologies to improve teaching and learning in primary and secondary schools in the United Republic of Tanzania. It first provides an overview of the education sector, including teacher employment data, education financing and existing policy frameworks. This is followed by a discussion of digital technologies in relation to teacher management, teacher training and development, pedagogy and critical use of such technology. The study then provides an overview of governance mechanisms in education, such as policies and social dialogue, as they relate to digitalization in education. It concludes by presenting the opportunities for and challenges of digital technology use in the Tanzanian education sector.

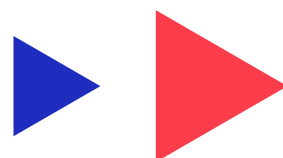


▶ 3. Methodology

In achieving the study objectives, a mixed methodological approach was applied, which included a desktop literature review, qualitative analysis and face-to-face and telephone interviews. In particular, these data collection methods allowed for in-depth inquiry, individual and organizational perspectives, context-based analysis and a careful review of primary and secondary documents. Throughout the study, all data used are empirical and evidence based, drawn directly from interviews with stakeholders and published research.

In relation to the desktop literature review, the study focused on digital technologies and the teaching profession in the United Republic of Tanzania at primary and secondary schools, including technical and vocational education and training (TVET) schools at the secondary level. Specifically, the researcher reviewed organizational and government reports, policy documents, published research and media reporting, leading to a synthesis of available evidence.

Apart from the literature review, the researcher conducted interviews with key informants, including those working in educational institutions (on the availability and use of digital technologies, teachers' wages and working conditions and pre-service and in-service training), education sector government officials (on the availability and use of digital technologies, priorities and planning in relation to technology in education, consultation with teachers on education matters and teachers' wages), individual parents with children studying at different school levels and the Tanzania Teachers' Union (TTU) (on issues related to teachers' working conditions, their involvement in policymaking, strategies to advance teachers' rights and the appropriateness of digital technologies). Interviews were also conducted with owners of private schools (on the employability skills of the teachers and the state of digital skills).



► 4. Brief overview of the education sector

The Tanzanian Government is mandated to provide education to its population through the formulation of relevant policies and the provision of funding.¹ Administration of education is the responsibility of the local government authorities, while policy formulation and funding remains largely the role of the central government. The structure of the formal education and training system constitutes two years for pre-primary, seven years for primary, four years for junior secondary, two years for senior secondary and at least three years of tertiary education. In addition to regular stream secondary schools, there are also technical secondary schools in which students learn standard secondary school subjects along with technical subjects. It takes four years to complete the technical secondary school cycle. The number of private and public primary and secondary schools in 2019 is shown in table 1. Of 3,742 public secondary schools, eight are technical secondary schools (Government of United Republic of Tanzania 2019).

► **Table 1. Number of primary and secondary schools in United Republic of Tanzania**

Category	Primary	Secondary
Public	16 223	3 742
Private	1 581	1 259
Total	17 804	5 001

Source: Government of United Republic of Tanzania 2019.

In terms of enrolment, 10,605,430 students were enrolled in public and private primary schools in 2019, with the majority being in the public system (95.9 per cent) (Government of United Republic of Tanzania 2019). It is estimated that 23.2 per cent of primary school-aged children are out of school (UNICEF 2018). In lower secondary, total enrolment stood at 2,185,037, with the majority (1,914,735) attending public schools, of which 8,068 were enrolled in technical secondary schools. Approximately 84 per cent of the student body in technical secondary schools was male. In terms of public and private upper secondary schools, 152,420 students were enrolled in 2019 (Government of United Republic of Tanzania 2019). Truancy is often the primary reason for dropouts at all school levels, with other reasons being pregnancy, death and disciplinary issues.

Currently, the government is implementing fee-free basic education in which pupils in public pre-primary, primary, lower secondary and technical secondary schools do not pay school fees. Some of the major challenges facing the education sector include: lack of teachers in rural areas, educational facilities, water supply, books and learning materials; inadequate wages and funding; and shortage of digital facilities and skills in the use of technology for pedagogical purposes.

4.1 Teacher data

4.1.1 Number of teachers and projected required teachers

In 2019, there were a total of 301,683 teachers in the country: 258,912 in public schools and 42,771 in private schools. In public schools, there were 139,850 male teachers and 119,062 female teachers. In private schools, there were 29,246 male teachers and 13,525 female teachers (Government of United Republic of Tanzania 2019). According to data from the President's Office, Regional Administration and Local Government, of all public secondary school teachers, there were 426 teaching in technical secondary schools (270 male and

¹ Specifically, the Tanzanian Governments role is to enable the implementation of new and existing policy initiatives, ensure educational resources are sufficient and appropriately distributed, support families in meeting the financial costs of education and promote equitable access to education and training.

156 female) in 2020. The majority of teachers in public primary and secondary schools are on permanent contracts.

In 2019, in both public and private primary schools, 97.8 per cent of teachers were qualified. Similarly, in both public and private secondary schools, 93.2 per cent of teachers were qualified, while the rest held qualifications below a diploma or are non-teaching professionals (Government of United Republic of Tanzania 2020).

Tanzanian public schools face a shortage of 80,000 teachers: 66,000 in primary and 14,000 in secondary (Malanga 2019). Specific subjects are more affected. For instance, there is a shortage of teachers for science subjects and mathematics. The government is undertaking steps to employ a total of 13,526 teachers in public primary and secondary schools in the 2019/20 fiscal year.

4.1.2 Teachers in rural areas

Rural settings in the United Republic of Tanzania are characterized by poor infrastructure, transport facilities, water services, health facilities and housing, in addition to limited access to electricity. The working and living conditions of teachers in rural settings are often poor and are characterized by high student-teacher ratios, inadequate and insufficient resources such as desks, high workloads and lack of teaching and learning materials, making teacher recruitment, motivation and retention challenging in rural areas. All private and technical secondary schools are located in towns and cities, where social services are available.

4.1.3 Teacher attrition

Available data show that between 2015 and 2018, a total of 14,690 teachers left the teaching profession in public primary schools, while in the same period, 2,088 teachers left the teaching profession in private schools.² Termination (due to disciplinary issues and absenteeism) was the primary reason for attrition in secondary schools.

The Public Service Retirement Act of 1999 stipulates 60 as the compulsory age of retirement, with voluntary retirement possible at 55. Key informant interviews reveal that in recent years many teachers have opted to retire at 55, the main reason being to receive pensions early so as to start businesses. Teacher salaries are not adequate to sustain a decent standard of living, leading many teachers to take on loans from financial institutions and private moneylenders.

4.2 Teacher training and professional development

4.2.1 Pre-service training

In the United Republic of Tanzania, pre-service teacher training is offered at three levels:

- Certificate in Teacher Education, commonly known as Grade "A", where student teachers are trained for two years to teach at pre-primary and primary schools. The certificate is obtained following completion of junior secondary school.
- Diploma in Teacher Education, where student teachers are trained for two years mainly to teach in ordinary-level secondary schools. The diploma is obtained following completion of senior secondary school.
- Degree in Teacher Education, offered by universities and university colleges of education. These institutions offer three-year programmes and prepare teachers for ordinary and advanced secondary schools, as well as tutors for teachers' colleges.

² Data from President's Office, Regional Administration and Local Government, 2020.

4.2.2 In-service teacher training and continuous professional development

According to the Standing Orders for Public Service (2009), certificate and diploma courses are two years in duration, while a first university degree requires coursework of at least three years' duration. Short in-service courses for public servants, including teachers, range from a few weeks to six months. The Standing Orders refer to in-service training as workshops and seminars. Despite the efforts by the government to ensure that teachers have access to in-service training and continuous professional development (CPD), the study, nonetheless, demonstrates that in-service teacher training is experiencing challenges.

First, the scope of in-service training has only reached a small segment of teachers, leaving training gaps of up to ten years for many teachers. In secondary schools, for example, teachers in arts have not had access to training as compared to their counterparts in science and mathematics. In primary schools, teachers teaching in early grades have had access to more training than their upper-grade colleagues. The priority for in-service training in the country has been science and mathematics for secondary schools and early grades in primary schools.

Second, the funds allocated by the government for in-service training are considered to be insufficient. As a result, only a few teachers have had the opportunity of in-service training in cases where it was deemed necessary. From the schools, it has mainly been head teachers and heads of schools and academic masters or mistresses attending workshops and seminars.

Lastly, in-service training in the country has been using the cascade mode through training of trainers, which allows a few teachers from a school to attend a workshop or seminar for competency building with the overall goal of transferring these competencies to their colleagues. The approach, however, has not been particularly effective, since those that receive the training, in most cases, do not train their colleagues in their working stations.

Nonetheless, data demonstrate that teachers are partaking in professional upgrading. In 2019, for example, a total of 2,591 teachers in public schools took study leave (Government of United Republic of Tanzania 2019).

4.3 Financing

4.3.1 Public schools

In the United Republic of Tanzania, education financing is a critical and priority area. The central government is the main financier of education through tax revenues. In implementing the Fee-Free Basic Education Policy, the government disburses about 18.7 billion Tanzanian shillings every month to primary and secondary schools (Mwalimu 2016; Right to Education 2016). In 2017/18, the education sector was allocated 4.71 trillion Tanzanian shillings, marking a decline of 1.3 per cent compared to the previous year (UNICEF 2018). The education sector accounts for 15 per cent of the total public budget, 3.9 per cent of gross domestic product (GDP), which falls short of the Global Partnership for Education's target of at least 20 per cent. As a result, 29 per cent of education funds came from development partners in 2017/18 (UNICEF 2018). Funding from development partners, however, is largely unpredictable.

Parents, on the other hand, are responsible for meeting other various costs, including: purchasing school uniforms and learning materials such as exercise books, pens and pencils; covering medical expenses of the child; and paying travel expenses for both day and boarding schools. On the other hand, in senior secondary schools, parents pay school fees of 70,000 Tanzanian shillings per year. The overall budget allocated to the sector is not sufficient; as such, it is supported by development partners.

4.3.2 Private schools

Private schools in the United Republic of Tanzania are not subsidized by the government and are almost exclusively dependent on school fees.³ In 2020, for example, school fees per annum totalled 6,400,000 Tanzanian shillings at the Feza Boys' Secondary School and 5,100,000 Tanzanian shillings at the Alpha High School, both boarding schools located in Dar es Salaam. Some schools owned by religious organizations are subsidized by their owners. Other funding sources include school economic projects and fundraising. Private schools are registered by the Commissioner of Education as per the National Education Act of 1978.

4.4 Terms and conditions of employment

Teachers in public schools are employed on a permanent and pensionable basis and receive a monthly salary, according to fixed scales based on specific qualifications. Provisions for annual increments are stated in their employment contract. In recent years, however, the government has encountered challenges in providing annual increments and salary increases among public servants, including teachers.

In private schools, terms and conditions of employment differ from one school to another. In some schools, teachers are employed on two-year contracts. In other schools, depending on need, teachers are hired from public schools to work as part-timers.

4.4.1 Teachers' wages

Teachers in the public sector have their own service scheme and salary scales. The salary for a primary school teacher with a certificate begins with an entry point of 419,000 Tanzanian shillings per month at the scale TGTS B1. A teacher with diploma starts at 530,000 shillings per month at the scale TGTS C1, and a teacher with a degree starts at 716,000 shillings per month at the scale TGTS D1. Normally, pre-service teachers that have completed diploma courses are assigned to teach in ordinary secondary schools, while pre-service teachers with complete degrees in teaching are assigned to teach in ordinary secondary, upper secondary and technical secondary schools or teachers' colleges. Teachers are meant to receive an annual salary increment and promotion after three years subject to the teachers' job performance and career development. Teachers' salaries in the public sector are considered to be inadequate, resulting in many subsidizing their income with various activities or taking on loans from financial institutions and moneylenders.

In private schools, depending on the type of school, some teachers are paid higher salaries compared to their counterparts in public schools. However, the minimum salary is the same as in public schools. Relatively higher salaries are paid in private schools to attract and retain competent teachers.

4.4.2 Pupil-teacher ratio

In 2019, the pupil-qualified teacher ratio (PTR) 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 (Government of United Republic of Tanzania 2019). The current PTR of 55:1 at the primary school level does not apply uniformly across all schools, districts or regions. The PTR varies by locality and region, as well as by urban versus rural setting.

4.4.3 Workload

According to the Quality Assurance Department in the Ministry of Education, Science and Technology,⁴ teachers at the primary school level are required to teach 28 to 30 periods per week, while those at the secondary level are required to teach 12 to 24 periods per week. Twelve periods are supposed to be allocated

³ Private schools with special needs programmes receive some financial support from the government.

⁴ Personal interview.

to heads of schools only. However, the study found that in primary schools some teachers had more than 70 periods per week. Such teachers were found to be those who teach the first grade in public primary schools. Reasons for the high workload include high enrolment rates and teacher shortages. In public secondary schools, some teachers teaching science subjects were found to have up to 50 periods per week. Apart from teaching, teachers were required to supervise extracurricular activities, as prescribed by the head of school. Teachers at private primary schools teach 25 to 30 periods per week and those in private secondary schools from 22 to 30 periods per week. The workload at technical secondary schools is relatively similar to that in private secondary schools.

4.4.4 Collective representation

In the United Republic of Tanzania, teachers are well represented through the TTU.⁵ The TTU is under the umbrella of the Trade Union Congress of Tanzania as a federation. The union fights for, among other issues, better wages and teachers' working conditions. According to TTU data, as of January 2020, the TTU membership base is 239,383 teachers. All teachers in public primary and secondary schools, including technical secondary schools, and tutors in teachers' colleges are eligible to be members of the TTU.

Teachers in private schools are not represented by a trade union. The Tanzania Association of Managers and Owners of Non-Government Schools and Colleges is a non-political association whose objectives, among others, are to establish collaboration between the Ministry of Education, Science and Technology and the managers and owners of non-government schools or colleges in all areas that will promote excellence in the field of education; improve communication between the ministry and the association; and provide members with information on current technical and technological developments in education.

4.4.5 Social protection

Teachers in public schools are covered by the Public Service Social Security Fund, while the National Social Security Fund serves private employees, including teachers in private schools. The benefits of the funds include survivor benefits as well as unemployment benefits that provide 33.3 per cent of the final salary following six months after termination.

In 2018, the government enacted a law that abolishes the rights of employees with pensions or other retirement plans to cash in any accumulated funds upon leaving an employer. This implies that if teachers in public schools leave work before the age of 50 or 60, for any reason, they have to wait until reaching the age of retirement to access their pensions.

The National Health Insurance Fund remains the largest social insurance fund providing access to health services for both public and private servants, including teachers in public schools.

4.5 Existing policy frameworks

There are several existing policy frameworks and major reform initiatives in the country. Of importance is the 2007 ICT Policy for Basic Education, which has guided ICT integration at all levels of schooling (Government of United Republic of Tanzania 2007).⁶ The policy addresses issues related to infrastructure and technical issues; curriculum and content; training and capacity-building; planning, procurement and administration; management and support; and monitoring and evaluation, with a mission to enhance access, equity, quality and relevance of basic education, while stimulating and improving teaching and lifelong learning. Further, the policy identifies a variety of ICT-related technologies relevant to the delivery of education, including radio, television, video, telephone (both fixed line and mobile), computer and network hardware and software, as well as equipment and services associated with these technologies, such as email, text messaging and radio broadcasts.

⁵ Also known in the Kiswahili language as Chama cha Walimu Tanzania.

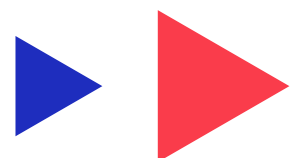
⁶ Pre-primary, primary, secondary, university and teacher education.

The 2014 Education and Training Policy also promotes the use of ICT in teaching and learning by emphasizing that education can be delivered much more efficiently if ICT and human resources with requisite skills are effectively utilized (Government of United Republic of Tanzania 2014, 42). The specific areas mentioned as challenges are poor application of ICT in teaching and learning; scarcity of human resources capable of teaching distance education; and limited supply of ICT equipment that meets global standards and developments in science and technology.

In 2009, the Ministry of Education and the Global e-Schools and Communities Initiative developed the Framework for ICT Use in Teacher Professional Development in Tanzania to integrate ICT into the teacher education system using the existing ICT infrastructure at government teacher training colleges. The initiative was proposed by the Global e-Schools and Communities Initiative, an international non-profit organization founded on the recommendation of the United Nations Task Force on ICT. Results from this study indicate that the 2009 framework is in effect.

The 2003 National ICT Policy, which was revised in 2016, was developed to provide more affordable access to a range of ICT services to as many people as possible in urban and rural areas to enhance sustainable socio-economic development and to allow the Tanzanian population to participate meaningfully in the globally networked economy. The policy views ICT as a means to enhance education opportunities and advocates the introduction of an e-education system. To date, this has not been realized.

In 2019 the government, through the Ministry of Education, Science and Technology, issued the Framework for Implementation of Technical Secondary Schools Education. The framework emphasizes the use of ICT and other related technologies to be employed in technical secondary schools to facilitate teaching and learning practices (Tanzania Institute of Education 2019).



► 5. Technology and teacher management

The Ministry of Education, Science and Technology utilizes a nationwide Education Management Information System (EMIS). The unit is located in the Policy and Planning Department of the ministry, which is responsible for production, dissemination and management of data for the entire sector. The main and desired function of EMIS is to collect, process, utilize and disseminate education data as well as related information to education stakeholders on a timely basis. The data are distributed through the Basic Education Statistics in Tanzania catalogue and website.

The EMIS provides educational data in six categories: baseline education statistics and demographics; human resource information; infrastructure and assets; school performance; financial management information; and documents such as research and field reports and policies. The time frame for data collection and publication is about six months. Schools are required to complete questionnaires and submit them to the district level, while teacher training colleges are required to submit them directly to the EMIS unit. The EMIS unit publishes data from April to June annually. The ministry publishes the annual data in two statistical booklets.⁷

According to the director responsible for the EMIS, low connectivity in some areas of the country is one of the major challenges. Internet networks and other supporting infrastructure in the country are still inadequate and unreliable, and do not cover a wide area. This is aggravated by the lack of electricity and broadband connections. Rural areas, in particular, are underserved. The situation requires heads of primary and secondary schools to fill in data in hard copy, which must then be submitted to statistics and logistics officers at the district level for data entry.

The United Republic of Tanzania has other systems in place to collect school-related information, such as the School Information System (SIS) and the Primary Records Manager (PReM). For example, the SIS 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, dramatically improving access to accurate and timely data for informed decision-making. However, the system is only being used in a few regions due to low internet connectivity. Plans are currently under way to scale the system up to be used countrywide. The PReM, on the other hand, enables students' records in public and private primary, secondary and technical secondary schools to be maintained and facilitates transfer of students from one school to another.

The country does not have a Teacher Management Information System (TMIS) which could contain requisite information on teachers in the country. The system could facilitate deployment and transfers of teachers and help to ensure that they are managed appropriately and in a manner that, as far as is possible, reconciles the wishes and needs of individual teachers with the needs of educational establishments and the wider national education system.

⁷ The first booklet provides data at the national level; the second booklet provides data at the regional level. Currently, statistics tables published in the Basic Education Statistics in Tanzania can be accessed online through the ministry's website.

► 6. Digital skills training and development for teachers

The United Republic of Tanzania has a range of digital and related technologies available in both public and private primary and secondary schools, including desktop computers, smart phones, laptops, printers, photocopiers, projectors and televisions.

The study reveals that teachers in primary, secondary and technical secondary schools are digitally literate at different levels. The challenge, however, is how to integrate digital competencies into teaching and learning, with the study showing that teachers need both digital literacy as well as skills development in integrating digital technologies into teaching and learning programmes. The study found, for example, that although all eight technical secondary schools had some digital facilities, only a minority of teachers made use of them in their teaching. Some teachers use digital devices for elementary functions such as typing examination questions and processing examination results. The availability of computers and projectors, along with internet connectivity in the eight technical secondary schools, is not satisfactory. For example, only two of the eight schools had access to the internet.

The training available in teachers' colleges and universities predominately focuses on basic technical and elementary skills, often not addressing gaps in pedagogical practices. According to the government, in 2016, only 95 secondary school teachers of information and computer studies were available in the country, compared to the 262 needed (Government of United Republic of Tanzania 2016). In some instances, dealing with this shortage meant organizing a "traditional one-time teacher training workshop" on ICT. For example, in 2011 and 2012, some secondary school teachers were provided with training on the use of ICT in teaching through these one-time workshops (Kihzoza et al. 2016). However, one-time teacher training workshops have remained ineffective in empowering teachers to use digital technologies or to successfully integrate them into their teaching. This has led to the use of other approaches to develop digital skills for teaching and learning, including continuous pedagogical and technical support and mentoring at school level using skilled colleagues or hiring outside expert consultants (the latter of which is particularly practised in some private schools).

The study further demonstrates that pre-service teacher education programmes related to digital technologies are not sufficient to prepare teachers to be effective users of digital technologies in the classroom. For example, a tutor from one of the teachers' colleges noted that their college had been without internet connectivity for almost four years, resulting in theoretical tuition of topics that require the internet to be taught properly. He also added that teacher trainees experience difficulties accessing materials using a reliable internet connection. As a result, teachers who graduate from such institutions lack the hands-on skills needed for using digital technologies for teaching and learning. It is equally important to provide teachers with frequent updates on digital skills, as technology is continuously advancing. Therefore, it is specifically recommended that CPD on the use of digital technologies for teaching and learning be provided regularly.

Teacher preparation programmes offer only one isolated course on educational technology. Tutors themselves, many of whom lack the requisite digital skills, need additional training to develop the knowledge, skills and expertise to teach with technology. The Teacher Education Support Project, which is being implemented jointly by the Tanzanian Government 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 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 (Government of United Republic of Tanzania 2017; Qorro 2020).

Fibre optic cable has already been laid down in all regions and districts through Tanzania Telecommunications Corporation Limited. However, connectivity in educational institutions remains a challenge.

► 7. Pedagogical uses of technology

The study reveals that there is some use of technology in the classroom, particularly in accessing learning content and in assessing student learning. The intensity of its use differs from one locality to another, from one school to another and between individual teachers. Private schools are making more use of technology due to the availability of devices and also in order to attract more students.

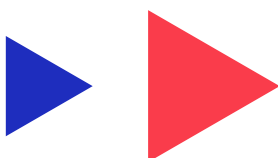
Overall, the use of digital technology as a pedagogical tool for teaching and learning, with which teachers could prepare and present lessons, keep students' records, process student assessments and manage teaching and learning activities, requires further integration and development.

Some primary schools (mostly private) and private and public secondary schools in urban areas, including technical secondary schools, have facilities with access to desktop computers, laptops, calculators, telephones, printers, scanners and video cameras. However, the use of such devices for pedagogical purposes depends on factors such as individual teachers' interests, knowledge and skills, school policy and access to the internet. Some schools with access to such facilities have made it mandatory for teachers to make use of them, at least for elementary functions such as preparing examinations using word processing, as noted by some of the interviewees. In some public schools, digital facilities are mainly obtained through projects or from organizations or individuals.

Statistics by the Tanzania Communications Regulatory Authority show that by 2018 there were 23 million internet users in the country. Some teachers, including in rural areas, are using devices such as smart phones and tablets to search for lesson material online. Following the closure of all educational institutions and schools in the country due to the coronavirus disease 2019 (COVID-19), private schools and some public schools in urban centres have been using messaging applications (such as WhatsApp) to create groups that include teachers, parents and students to share written notes and recorded lectures. Radio and television programming have also been utilized to enable student learning. Some challenges in accessing remote learning include limited reach to students in rural settings, lack of access to needed devices and infrastructure in some families, and inability of some parents to closely monitor their children's learning.

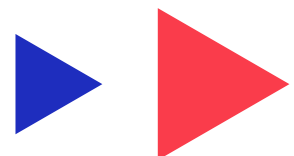
The study also noted an increase in websites and applications related to education in the country. Examples of such applications include tHL, ShuleDirect and Tzshule, which contain learning material such as lesson notes and examination questions. Some schools, mainly private schools, have also created webpages, which teachers and students could use for teaching and learning purposes. It is difficult for teachers and students in rural settings to access online platforms and websites due to limited internet connectivity. Despite the opportunities to use digital technologies, some teachers are still using handwritten notes, composing examinations by hand and using the chalkboard. The main reason provided for this finding was that some teachers, especially those in the older age bracket, require additional support to adapt to technological changes.

The availability of electricity, as a major challenge to schools located in rural settings, is being addressed by the government through the Rural Energy Agency, which is looking to install electricity in every village in the country. According to available data, a total of 9,001 villages in the country, representing more than 74 per cent of the villages, have had electricity installed (Daily News 2020). In the light of these efforts, government directives mandate that once a village has received electricity, all institutions in that village, including schools, must be supplied with electricity. The implication is that the use of digital technologies will slowly emerge in rural schools. The current status of digitalization in Tanzanian schools is summarized in table 2.



▶ **Table 2. Current status of digitalization in teaching and learning**

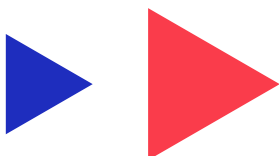
Category	Current status
Power connectivity	<ul style="list-style-type: none"> ▶ No power connectivity in some schools in rural areas ▶ Improving in some villages due to power connectivity ▶ Schools in urban settings have better access
Internet connectivity	<ul style="list-style-type: none"> ▶ Unreliable or no internet connectivity ▶ Affordability remains a barrier to access ▶ Limited bandwidth to meet real demand
Pedagogical skills	<ul style="list-style-type: none"> ▶ Mostly limited to the use of presentation software ▶ Inadequate use of digital technologies in classrooms ▶ Inadequate pre-service and in-service training on the use of digital technologies for teaching and learning ▶ Some tutors from teachers' colleges receive training in the use of digital technologies ▶ Lack of specialized IT teachers and tutors
Digital infrastructure in schools	<ul style="list-style-type: none"> ▶ Inadequate infrastructure in both primary and secondary schools ▶ Private schools are better equipped than public schools ▶ Outdated technology ▶ Increasingly being used for administrative functions



► 8. Teaching ethical and critical use of digital technology

Ethical and critical use of digital technology is a significant aspect that needs to be taught at all levels of education. However, this area has been overlooked in primary, secondary and technical secondary schools and in teachers' colleges and universities. Nonetheless, the study found that students are taught to assess the authenticity of materials that are accessed online for academic purposes, as information available on the internet is not regulated for quality or accuracy.

Interviews with tutors who teach ICT in teachers' colleges revealed that ethical and critical use of digital technologies is not part of the syllabus. Similarly, it is not an area of focus in the Information and Computer Studies syllabus for the Diploma in Secondary Education, which dates to 2007. The 2007 ICT syllabus needs to be updated as technology has evolved dramatically since then, including the emergence of social networks and virtual platforms. Some education stakeholders recommended that students be taught about critical and ethical use of technologies, especially when it comes to intellectual property, plagiarism and infringements of privacy.



▶ 9. Relevant regulatory or policy frameworks in relation to digitalization and education

9.1 Status of legislation

In the United Republic of Tanzania there are policies, frameworks and sector plans⁸ in place that are related to digitalization in the education sector, though their implementation remains a challenge for the following reasons:

- ▶ limited strategic leadership to pioneer and champion activities related to digital technologies;
- ▶ largely uncoordinated and piecemeal efforts at both the government and school levels;
- ▶ lack of appropriate governmental structures for effective deployment and integration of digital technologies;
- ▶ limited budgetary allocation for ICT in education;
- ▶ lack of teaching personnel with digital skills in schools and training colleges;
- ▶ lack of availability of digital facilities;
- ▶ lack of adequate infrastructure, including electricity and internet connectivity;
- ▶ dependency for access on donors, the private sector and civil society organizations, raising concerns about universality and reliability of such efforts.⁹

9.2 Status of relevant policies

The Tanzanian ICT Policy of 2016 provides guidance on how the country can harness ICT development potential towards achieving the Tanzania Development Vision 2025 goals. Moreover, the formulation of other institutional guidance manuals provides impetus to implementation of ICT policy. Several achievements have been registered to date, including the ICT Policy for Basic Education, 2007, whose basic aim is to enhance teaching and learning through the use of ICT in schools. While there has been an increase in ICT study programmes in Tanzanian schools, for example with the introduction of computer studies as an examinable subject in national examinations, ICT policy still mainly reflects the broader Vision 2025 goals. There is a need for the setting of short-term goals to track progress towards achieving the broader goals.

The study also found that funding is not sufficient for the maintenance of ICT facilities and for software licence subscription fees. Funding shortfalls have also affected the training of teachers in ICT for teaching and learning. The perception of use of ICT among tutors is positive, as it is considered necessary to prepare secondary school students with digital skills for the changing labour market.

The study further indicates that there is inadequate provision of ICT material and equipment to support schools' needs, including in technical secondary schools. Many schools lack teachers with adequate qualifications in special needs education and lack physical and ICT facilities to assist children with special needs in their learning. This is contrary to the country's Persons with Disabilities Act of 2010, which stipulates that "children with disabilities shall be provided with appropriate disability-related support services or other necessary learning service, from a qualified teacher or a teacher assigned for that purpose."

⁸ Policies and frameworks such as the National ICT Policy (2003, 2016), Tanzanian ICT Policy for Basic Education (2017), Education Sector Development Plan, Secondary Education Development Plan, Primary Education Development Plan and Framework for Implementation of Technical Secondary Schools Education (2019) recognize the importance of using digital technologies in education.

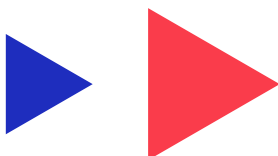
⁹ For example, Halotel Tanzania has provided satellite dishes for some schools to access internet via i-knowledge technology. Vodacom Tanzania, in 2019, donated computers and routers worth over 48 million Tanzanian shillings and provided internet connectivity to ten schools in Simiyu region as part of its programme to support the education sector (Daily News 2016).

Ongoing educational programmes, including the enactment of fee-free basic education through the Fee-Free Basic Education Policy, are major milestones in the country's education system. These policy initiatives have opened doors for many children and youth who otherwise would have missed a chance to develop ICT skills and improve their employability. However, the existing policies in relation to digital technologies were formulated prior to the emergence of new digital technologies and platforms. Hence, there is a need to revise them to take into account current labour market demands and thereby digital skills. There is also a need for more qualified teachers at all levels of education and for digital facilities in schools.

9.3 Status of social dialogue mechanisms

The TTU regularly consults with the Ministry of Education, Science and Technology on education matters such as teacher salaries, teacher training, curriculum design and policy development via internal meetings, lobbying and follow-up consultations. The last time the TTU organized a strike was in 2012, which was over unpaid dues and improving benefits, working conditions and salaries. The strike had the support of 97.5 per cent of teachers in public primary, secondary and technical secondary schools and teachers' colleges. Some of the issues of contention between the government and the TTU were enhanced promotions; establishment of a teachers' professional board; allowing teachers to go for upgrading programmes; and increased teacher salaries. According to the TTU, some of these issues have been resolved. For example, the teachers' professional board, which is an independent and impartial body designed to help transform the profession and ensure continually high standards, is in the final stage of establishment. The TTU, through the Trade Union Congress of Tanzania, is currently in discussions with the government to increase public servant salaries, among other issues.

With regard to stakeholders' involvement in policy formulation, the study established that policymakers within the government hierarchical system are the main stakeholders involved and consulted in policy formulation. Some non-governmental organizations, community-based organizations and teachers interviewed reported being first informed about policies through the media or the new school curriculum. Hence, an inclusive and participatory approach is needed that incorporates feedback from grass-roots members and stakeholders.



► 10. Support frameworks for teachers

Literature shows that there is a strong positive relationship between CPD and teachers' self-confidence and efficacy, with positive impacts on their overall job satisfaction.

In the United Republic of Tanzania, in-service training for teachers is critical, especially since some teachers are not adequately trained in pre-service training institutions, in particular on the use of digital technologies for pedagogical purposes. In order for in-service training to be effective in a changing world, teachers require instruction on the use of digital technologies for pedagogical purposes. Considering the challenges of the educational sector, including overcrowding of students in classrooms, digital technologies can simplify some of the tasks of teachers, including preparing and presenting lessons, keeping student records, evaluating student assignments and remote teaching. The government and other education stakeholders, including the TTU, need to undertake collaborative efforts to integrate technologies and prepare teachers in their use.

In order for in-service training to be effective, it is proposed that a new teacher training approach be adopted (Chen and McCray 2012). The new teacher training approach emphasizes promoting all aspects of a teacher's development, including attitudes, knowledge and practice. Teachers will therefore be equipped to prepare students for a changing world, focusing on skills such as digital literacy, communication and collaboration, critical thinking and problem solving, citizenship, learning to learn, imagination and creativity and self-efficacy. In light of the above, it is recommended that the following models be used to enhance CPD for teachers in the United Republic of Tanzania.

- Ensure that training is ongoing rather than a one-time, short and cursory workshop to allow for the learning of new strategies and skills as they emerge.
- Emphasize collective and collaborative participation between teachers from the same setting, school and department to enable sharing of resources and best practices.
- Provide hands-on opportunities to develop new knowledge and skills instead of lectures that target knowledge transmission. Teachers' initial exposure to a concept should not be passive, but should engage them through varied approaches to ensure active participation in making sense of a new practice. Meaningful training must actively engage teachers in discussions on their profession and subject matter.
- Conduct continuous accompaniment to ensure that the knowledge and skills acquired by teachers during training are transferred to the classroom.

Quality education has been linked to quality teacher working conditions. Since some teachers are reluctant to teach in rural and disadvantaged areas, monetary and non-monetary incentives and other measures could be used to support teachers already posted in these areas and to attract others, including providing higher salaries above the minimum salary as per their salary schemes and housing allowances. Introducing such allowances can also improve the workload of teachers working in these areas. The Tanzanian Government is currently improving the provision of other services such as water, electricity and communication networks in rural areas, which may also work to attract teachers to those settings.

Regarding remuneration, particular attention needs to be given to ensuring that teacher salaries are equivalent to those of other professions requiring similar qualifications. The annual increment and salary increase, which have not been in effect for the past five years, have to be considered to ensure a reasonable standard of living for teachers and their families.

As an additional support for teachers, stakeholders have recommended that resource centres be established in villages supplied with electricity. Stakeholders also recommended that the existing teacher resource centres be used by teachers, students and villagers to access online materials from various sources, if they are supplied with electricity and internet connectivity. Currently, the centres are only equipped with books. The centres can also be linked to satellite schools located in their vicinity.

► 11. Analysis of positive contributions and challenges

Although the government has yet to announce any concrete and sustainable steps to further access to digital technologies and online learning in education, the government through the Tanzania Institute of Education has made provision for online learning, particularly in light of the COVID-19 crisis. Some material can be accessed from the Tanzania Institute of Education website by primary, secondary and technical secondary students. Learning programmes are also being aired through various television and radio stations.

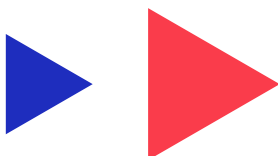
The use of digital technologies is a priority for many education stakeholders. Stakeholders, including the TTU and some parents, have noted the following challenges to integration of ICT in teaching and learning: lack of access to devices in some homes and schools to facilitate learning; lack of support from parents on the use of ICT for learning; lack of electricity, especially in rural areas; and inadequate skills to prepare material to be used in digital facilities. According to the TTU, utilization of digital technologies in teaching and learning is likely to favour a certain segment of the population, particularly those living and working in urban settings.

The research has revealed that there has been improvement in digital training and development for teachers in the country. Some teachers have at least basic knowledge and skills related to the use of digital technologies. Moreover, policies and frameworks exist that insist on and recognize the use of digital technologies in education, though they need to be updated.

There are, however, some challenges in the training and development of teachers' digital skills, including insufficient facilities in training colleges, which has led to digital skills being taught theoretically. Ineffective use of digital technologies impacts both teachers and students, limiting the development of skills needed in the contemporary world. Teachers spend a lot of time using traditional methods in teaching and assigning and recording marks and grades for a large number of students. If digital technologies are utilized properly, they can assist with teacher workloads, especially in classrooms with large student-to-teacher ratios.

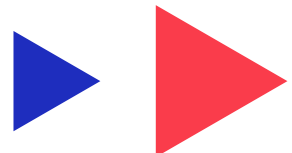
Interviews with key stakeholders also revealed that technological and digital skills can assist with delivering more interactive and engaging lessons, which is not common practice in Tanzanian schools, even in those with digital facilities. Some stakeholders have expressed reservations about the use of digital technologies, particularly those that involve online learning.

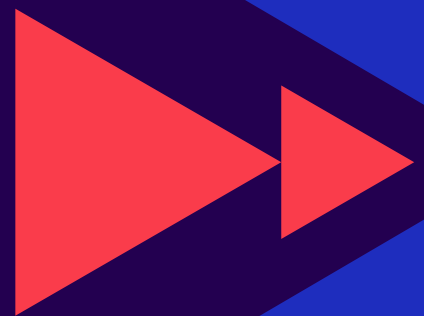
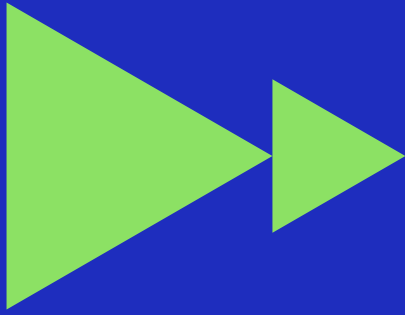
Stakeholders recommended that two initiatives be undertaken: the government and the private sector make available digital facilities and internet connectivity to schools in accordance with the school environment, such as the use of tablets that can be recharged with solar energy; and teachers are trained in the use of digital technologies for teaching and learning. Generally, there have been some positive contributions in relation to digitalization in education, though some challenges still remain, as shown in table 3.



▶ **Table 3. Positive contributions and challenges in relation to digitalization in education**

Category	Positive contribution	Challenges
Digital skills training and development for teachers	Teachers have basic skills, especially young teachers	<ul style="list-style-type: none"> ▶ Integrating digital skills in teaching and learning ▶ Inadequate in-service training for teachers on the use of digital technologies
Pedagogical use of technology	Some teachers are making use of technology	<ul style="list-style-type: none"> ▶ Lack of continuous and lifelong training on digital skills and use of technology ▶ Limited access to digital tools and facilities
Ethical and critical use of digital technologies	Some students taught to assess authenticity of online material	<ul style="list-style-type: none"> ▶ Not recognized as a critical area
Regulatory and policy frameworks	Various policies and frameworks are in place supporting the integration of ICT	<ul style="list-style-type: none"> ▶ Insufficient ICT infrastructure and lack of funding for maintenance of digital infrastructure ▶ Lack of implementation of policies due to lack of funds and access to digital technologies ▶ Outdated policies and frameworks ▶ Policy gaps, including lack of a teacher policy framework





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