THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL DIGITAL EDUCATION GUIDELINES FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

January, 2025

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FOREWORD

I am pleased to present the National Digital Education Guidelines for Technical and Vocational Education and Training (TVET). This is key to the implementation of the National Digital Education Strategy 2024/25–2029/30, a critical initiative that puts emphasis on Skills-Minded, Connectivity, Content, Computing Infrastructures and Capacity of educators, learners and administrators (4C's) in the transformation of Tanzania's education sector towards producing ready-to-work labour force. The Government recognizes that digital technologies are essential components/pillars ICT for achieving the desired learning outcomes in technical and vocational education and training programs. The scarcity of appropriate job-tied ready to work skilled graduates from technical and vocational training colleges hinders our country's capacity to address various challenges, delays national transformation, and extends the path to a modern, knowledge-based economy.

The world has demonstrated the accelerated adoption and adaptation of digital technologies in every aspect of life and work. Proper integration of digital technologies in the national economy shall lead to self-reliance for individuals' businesses as well as at the country level through increased productivity, and higher incomes for the nation. However, in line with this aspect of digitalization, Tanzania's education system has faced challenges in digitalizing the teaching and learning process, and so it requires a fundamental shift from the current traditional methods to a forward-looking approach. This shift includes the integration of digital technologies within TVET institutions, which is crucial for developing the relevant digital competencies needed for true national development, enhanced productivity, and economic growth.

The National Digital Education Guidelines for TVET are designed to support the attainment of the desired learning outcomes, as well as development of essential digital competencies that are directly relevant to the evolving demands of the ready to work labour force, rather than merely focusing on the acquisition of education and training certificates. This means the graduates from those institutions should be equipped with hands-on-skills for every specific job they are trained for. On this assumption, these Guidelines target all stakeholders who seek to enhance the employability and self-employment of Tanzania's TVET graduates through digital education and

training. It emphasises a flexible, practical, and technology-driven approach to learning, complementing the traditional approach to teaching and learning that has not been so effective in fully leveraging the potential benefits of technology.

Moreover, these guidelines advocate for a shift in the management of digital education and training from a solely government-led approach to one that is driven by Public-Private Partnerships (PPP), ensuring a more inclusive and responsive digital education and training framework within TVET institutions.

This initiative has been benchmarked with global digital education trends and underscores the growing importance of technical and vocational digital competencies for economic development. The Guidelines aim to foster a digitalised educational environment that prepares Tanzanian learners to succeed in the digital era by promoting a culture of innovation, self-employment.

A comprehensive list of targets and indicators as aligned with these guidelines for monitoring and evaluating the efficiency and effectiveness of ICT integration in TVET institutions is provided in the implementation plan for the National Digital Education Strategy 2024/25 – 2029/30

These Guidelines will be implemented in TVET under the supervision of NACTVET. I therefore encourage all stakeholders to fully support and adhere to these Guidelines to build an inclusive, equitable, and future digitised TVET education system that empowers learners to contribute more to Tanzania's socio-economic development.

Prof. Carolyne I. Nombo
PERMANENT SECRETARY

List of Acronyms

Acronym	Full Form
AI	Artificial Intelligence
ANFE	Adult and Non-Formal Education
AR	Augmented Reality
BEST	Basic Education Statistics
EMIS	Education Management Information System
FDC	Folk Development College
GAI	Generative Artificial Intelligence
HLIs	Higher Learning Institutions
ICT	Information and Communication Technology
IT	Information Technology
IoT	Internet of Things
LMS	Learning Management Systems
MICIT	Ministry of Information, Communication and Information Technology
MoEST	Ministry of Education, Science and Technology
MOOCs	Massive Open Online Courses
NACTVET	National Council for Technical and Vocational Education and Training
NSDS	National Skills Development Strategy
OER	Open Educational Resources
SAMR	Substitution, Augmentation, Modification, Redefinition
SQA	School Quality Assurance
TPACK	Technological Pedagogical Content Knowledge
TET	Technical Education and Training
TPSF	Tanzania Private Sector Foundation
TVET	Technical and Vocational Education and Training
UDL	Universal Design for Learning
UNESCO	United Nations, Educational, Scientific and Cultural Organization
VET	Vocational Education and Training
VR	Virtual Reality

4Cs	Connectivity, Content, Computing devices and Capability of educators, learners and administrators

Definition of Key Terms

Key Terms	Definition
Digital Education:	Also known as digital learning, refers to the use of digital technologies, tools, and platforms to facilitate teaching, learning, and assessment within educational settings.
Technical and Vocational Education and Training:	Education and training programs designed to equip learners with hands-on skills and knowledge related to specific trades, professions, or occupations.
Education Digital Tools:	Software applications or platforms that utilise digital technologies to enhance teaching, learning, and administrative processes within educational institutions.
Ethical Use of Digital Technologies:	Ensuring the deployment of digital tools aligns with moral principles, respects human rights, promotes fairness, transparency, and accountability, and minimises harm.
Equity and Inclusivity:	Ensuring the benefits of digital education are accessible to all individuals, regardless of socio-economic status, geography, gender, ethnicity, or other characteristics.
Data Privacy and Security:	Protecting the confidentiality, integrity, and availability of data processed by digital systems to prevent unauthorised access, use, or disclosure as per laws of the land.
Sustainability:	Ensuring digital projects are viable, scalable, and environmentally, socially, and economically sustainable over the long term.
Curriculum Integration:	Educational approach of connecting and integrating different subjects or areas of learning to provide a

	more cohesive and meaningful learning experience for learners.
Capacity Building:	Strengthening the knowledge, skills, and resources of individuals and institutions involved in digital education and implementation through training and professional development initiatives.
Education Digital Infrastructure:	Hardware, software, and tools necessary to develop, deploy, and manage digital education applications in TVET institutions.
Responsible Stakeholders:	Stakeholders who play crucial roles in ensuring the effective, ethical, and responsible use of digital technologies in TVET education.
Educators:	A person who provides instruction or education. In the context of TVET, educators refer to teachers, trainers, tutors, lecturers, instructors or facilitators with competencies to provide education and training to students/learners in technical and vocational fields.
Computer Networks:	A collection of interconnected devices, such as tablets, smartphones, printers, computers, servers, routers, and switches that communicate with each other to share resources and data.
Educational and training networks:	Systems or structures designed to facilitate the exchange of knowledge, skills, and resources among individuals, institutions, or organizations involved in education and training.
Zero-Rating:	Refers to the practice where internet service providers (ISPs) or mobile network operators allow users to access certain content or services without counting it against their data plan or incurring data usage charges.
ICT Competency Standards:	Also known as Information and Communication Technology Competency Standards refer to a set of guidelines, skills, and knowledge that individuals

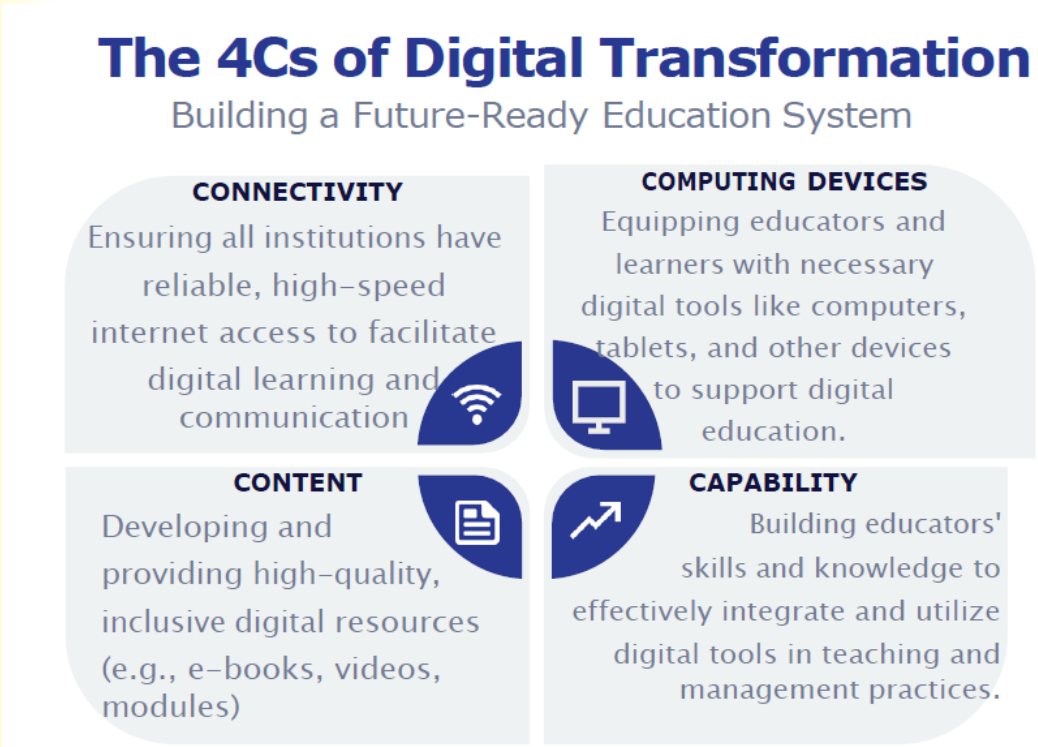
need to effectively use digital technologies in various professional and educational contexts.

Micro credentials: Short, competency-based recognition courses that verify, validate, and attest someone have gained specific skills and competencies

1.0 INTRODUCTION

The Government through the Ministry of Education, Science, and Technology (MoEST) has developed the National Digital Education Strategy 2024/25 - 2029/30 to facilitate the nation's digital educational agenda forward with a vision of "improving learning outcomes through ICTs". The main focus of the Strategy is on Connectivity, Content, Computing devices and Capability of educators, learners and administrators (4C's) in the transformation of Technical and Vocational Education and Training (TVET). Recognizing the transformative potential of digital tools in modernizing education, MoEST has developed the National Digital Education Guidelines for TVET. These Guidelines serve as a roadmap to ensure that digital education and training becomes a core component of TVET institutions across the country, aligning with Tanzania's broader educational goals.

The Government approved a ten-year National Skills Development Strategy (NSDS) and started reforms in the TVET sector. Central to the Ministry's vision is the enhancement of education quality and the expansion of access to learning opportunities through digital means. The National Digital Education Guidelines for TVET are designed to support this vision by providing a comprehensive framework for the effective integration of digital technologies. This initiative is rooted in the objectives of key national policies, including the Tanzania National ICT Policy of 2016 and the Education and Training Policy of 2014 version of 2023, which emphasise the importance of preparing students to become ready –to-work labour force upon their graduation to meet the jobs specific demands of the modern job market as well as fostering innovation and self-employment.



The Government has been addressing critical challenges associated with the digital transformation of education, such as ensuring equitable access of digital devices, protecting data privacy, and upholding ethical standards in the use of digital tools. Thus, skills and abilities are now amenable for every specific job execution or support in the digital market and must be embedded in every TVET training. The Government has initiated several digital education projects and initiatives aimed at improving quality and transforming TVET education through the use of digital technologies.

These initiatives include the following: (a) connecting 37 out of 82 VETA colleges and 36 Teacher Colleges in the National ICT Broadband Backbone (NICTBB) to facilitate teaching and learning through ICT (b) distributing more than 700 computers in TVET colleges to strengthen ICT integration in teaching and learning, (c) implementing two major projects, namely, East African Skills for Transformation and Regional Integration Project (EASTRIP) and the Education and Skills for Productive Jobs (ESPJ) Project that have been instrumental in enhancing ICT capacity within the TVET sector.

EASTRIP has improved some TVET institutions by upgrading digital infrastructure, providing advanced equipment, and developing ICT-based training programs to foster industry- relevant skills. These upgrades have enhanced digital learning environments, making them more responsive to both the local and regional labour markets. In addition, the ESPJ Project has supported professional development of TVET educators and administrators in various aspects including ICT. Together, these projects have strengthened the integration of ICT in TVET institutions, fostering flexible, student-centred learning environments and enhancing digital literacy skills among educators and learners. Other projects include the Skills for Employment Tanzania (SET) that foster enhanced youth (self) employment by improving the Vocational Skills Development (VSD) system.

These projects have strengthened the skills development systems, and aligned training programs with the demands of the labour market. While the Government has significantly made a progress in the TVET sector, there is a need to take stock of and scale up successful reforms to generate significant impact because of evolving global, national and local contexts that affect the digital landscape, priorities and impact of the skills development system in Tanzania.

The National Digital Education Guidelines for TVET outline clear directives for critical areas such as infrastructure, digital content, capacity building, ensuring that digital education is implemented in a manner that is responsible, inclusive, and beneficial for all learners, regardless of their socio-economic background.

Furthermore, the Guidelines are focused on enhancing the capacity of educators and administrators to effectively utilise digital technologies in their teaching and management practices. By fostering a culture of continuous improvement, research, and innovation within TVET institutions, the Ministry seeks to create an educational environment that is dynamic, responsive, and capable of adapting to the rapid changes of the digital age.

As Tanzania continues to progress in a digital-based economy, the Government views the National Digital Education Guidelines for TVET as a crucial tool in achieving this goal. Through the successful implementation of these Guidelines, the Ministry is confident that

Tanzania's TVET system will be better equipped to produce skilled graduates who are ready to contribute to the nation's socio-economic development and thrive in the global digital economy.

1.1 Objectives

The National Digital Education Guidelines for TVET aim to enhance the integration and utilisation of digital technologies within Technical and Vocational Education and Training institutions in Tanzania. The primary objectives are as follows:

i. To ensure TVET institutions are equipped with affordable, reliable, and secure digital infrastructure, including internet connectivity, hardware, and software.

ii. To promote the development and implementation of ICT-integrated curricula to equip students with necessary digital competencies.

iii. To foster the creation and utilisation of high-quality and inclusive digital content to support effective learning outcomes.

iv. To utilise digital technologies to enhance assessment and feedback mechanisms, improving the overall quality of student evaluations.

v. To strengthen the skills and knowledge of educators and administrators to effectively incorporate digital tools into teaching and management practices.

vi. To promote research, innovation, entrepreneurship and partnership in digital education and training to keep pace with technological advancements and industry needs.

vii. To foster inclusive development and use of emerging technologies with a special case within TVET institutions.

viii. To use digital technologies to enhance assessment mechanisms and approaches by pushing more on skills and practical capability assessment (hands on skills assessment) for each specific job expertise.

1.2 Scope

The scope of the National Guidelines for Digital Education for TVET institutions encompass all aspects of ICT integration within TVET institutions (TETs, VETs and FDCs). This includes the development of digital infrastructure, the integration of digital tools into curricula, the creation of digital content, the use of technology in guiding assessment, capacity building for educators, and the promotion of research, innovation and entrepreneurship. The Guidelines also address the need for ethical practices and secure usage of digital technologies, ensuring that all TVET institutions adhere to these standards.

1.3 Guidelines Context

The rapid advancement of digital technologies globally has brought transformative changes to education, particularly in TVET. As Tanzania strives to become a knowledge-based country, there is an increasing demand for a skilled ready to work labour force capable of leveraging digital tools and technologies. The National Digital Education Guidelines for TVET align with the National Digital Education Strategy 2024/25 - 2029/30 and the National AI in Education Guidelines.

The Guidelines will enable realisation of the national goals set in Tanzania's key policies and legal frameworks including the National ICT Policy 2023, National Education and Training Policy (2014, version 2023), Personal Data Protection Act 2022, Tanzania Digital Economy Strategic Framework 2024–2034, Five-Year Development Plan III (FYDP III) 2021/22–2025/26, and Government Cyber Security Strategy 2022–2027.

The National ICT Policy 2023 underscores the Government's commitment to expanding digital infrastructure in schools and colleges, ensuring it is safe, reliable, and affordable while the Tanzania Digital Economy Strategic Framework (DESF) 2024–2034 emphasizes the importance of digital literacy and ICT skills development in driving innovation and economic growth. Additionally, the Government Cyber Security Strategy 2022–2027

provides a framework to secure digital environments in education, ensuring the integrity of ICT systems and protecting learners' data.

At the regional level, Agenda 2063 of the African Union emphasises the importance of digital technology in creating a skilled workforce. Specifically, the Pan African Initiative for the Digital Transformation of TVET and Skills Development Systems in Africa provides a guideline for digital transformation, aimed at strengthening ICT infrastructure and capacity within the TVET sector across Africa. Furthermore, the Southern African Development Community (SADC) continues to promote regional initiatives aimed at improving digital literacy, expanding access to e-learning, and integrating ICT into TVET systems to improve education quality. The Guidelines are also in line with the Continental Education Strategy for Africa (CESA) 2016 – 2025 which emphasizes the use of ICT to improve access, quality and management of education and training systems.

At the global level, the guidelines are in line with various policies, strategies, and digital initiatives including the UNESCO Digital Transformation of TVET and Skills Development Systems in Africa 2022 which highlights the processes, steps and tools that nation states should consider adopting in digitalisation of TVET and skills development. Moreover, UNESCO enhancing TVET through digital transformation in developing countries 2023 which focuses on context, trends and challenges inherent to digital transformation in TVET in different LMICs, focusing on national policy-makers and regional or institutional practitioners.

1.4 Guiding Principles

The implementation of National Guidelines for Digital Education for TVET will be guided by the following principles:

i. Equity and Inclusivity: The integration of digital technologies must be accessible to all TVET learners, regardless of their socio-economic status or geographical location.

ii. Quality and Relevance: Digital tools and content should enhance the quality of education and training and align with industry standards and national education and training policies and objectives.

iii. Integrity: TVET institutions must demonstrate transparency, honesty, and accountability in all aspects of digital education, from planning and implementation to evaluation and continuous improvement.

iv. Accountability and Transparency: Ensure TVET institutions maintain clear objectives, measurable outcomes, and open communication in digital education and training initiatives, promoting responsible management, ethical resource use, and trust among stakeholders.

v. Collaboration and Partnership: Successful digital education and training integration requires collaboration among various stakeholders, including government agencies, educational institutions, private sector partners, and international organisations.

vi. Diversity: Promote an inclusive digital education environment within TVET institutions by recognizing and valuing the unique perspectives, skills, and experiences of all students and instructors.

vii. Professionalism: Uphold high standards of professionalism within TVET institutions by ensuring that all digital education and training practices are conducted with competence, integrity, and respect.

viii. Research and Innovation: Foster a culture of ongoing exploration and integration of emerging digital technologies and pedagogical approaches within TVET institutions.

ix. Sustainability and Resilience: Preserving resources and advocating for continuous maintenance as well as upgrading of digital infrastructures and competencies to support long-term educational goals and ensure resilience against challenges.

2.0 DIMENSIONS AND GUIDELINES

The National Digital Education Guidelines for TVET consist of fourteen (14) dimensions as depicted in Figure 1. These dimensions are aligned with the National Digital Education Strategy 2024/25 - 2029/30 and National Guidelines for Artificial Intelligence (AI) in Education 2024. These dimensions are infrastructure and access; ICT integration in the curriculum; digital content development; digital assessment; human resource and capacity building; research, innovation and entrepreneurship; emerging technologies; change management; partnerships and resource mobilisation; governance, management, and regulatory framework; data management and analytics; security, safety, and ethics; technical support and maintenance; and development and use of AI. The guidelines for each dimension are described below:

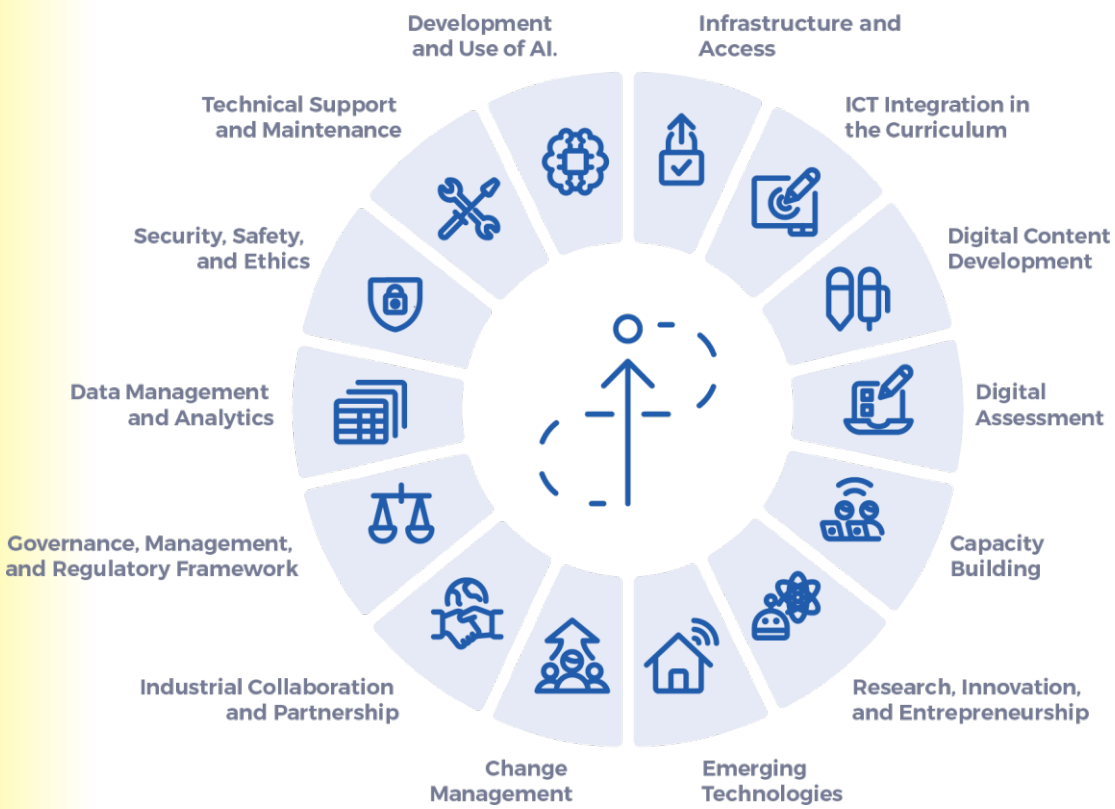


Figure 1:Dimensions of the Guidelines

2.1 Infrastructure and Access

ICT infrastructure and access are vital in ensuring TVET institutions have the necessary physical and digital resources to provide educators and learners with assured access to technology, which is foundational for creating a skilled workforce ready to meet the demands of a digital economy. In view of this, the regulatory body shall ensure that:

2.1.1 Digital devices and services

a. The standards for digital devices and services in teaching and learning are established for TVET institutions;

b. TVET institutions have in place acceptable digital devices and services for learners and educators;

c. TVET institutions have in place assistive devices and services for learners and educators with special needs;

d. Mechanisms for affordable digital devices and services is established in all TVET institutions; and

e. Mechanisms for affordable digital devices and services is operational in all TVET institutions.

2.1.2 Digital educational content platforms

a. Digital educational content platforms (e-libraries, digital content repositories, and Learning Management Systems) for all TVET institutions are established and used;

b. A national database of available digital resources across all TVET institutions is established (registering, accessing, sharing, etc);

c. An integrated digital educational platform for exchange of content and services is implemented among TVET institutions;

d. A central storage platform of digital educational content for TVET institutions is established to facilitate teaching and learning; and

e. A central storage platform of digital educational content for TVET institutions is used to facilitate teaching and learning.

2.1.3 Internet connectivity

a. The status of ICT infrastructures (e,g., Internet connectivity, digital devices) is determined annually in all TVET institutions;

b. TVET institutions have established assured Internet connectivity for teaching and learning;

c. Educational and training networks for collaborations are established for TVET institutions;

d. TVET institutions have access to reliable broadband Internet;

e. Mechanisms for affordable Internet services for TVET institutions is established; and

f. Mechanisms for affordable Internet services for TVET institutions is operationalized.

2.1.4 Digital facilities and power supply

a. Mechanisms for affordable digital facilities (computer labs, digital libraries, multimedia studio, virtual labs, driving simulators, flight simulators, etc.) for teaching and learning is established in all TVET institutions;

b. TVET institutions have in place sufficient digital facilities to facilitate teaching and learning;

c. TVET institutions have in place distributed reliable power supply (national grid, solar etc.) to support teaching and learning; and

d. TVET institutions have in place reliable power supply for

digital facilities (labs, classrooms, libraries etc.) to support teaching and learning.

2.1.5 Access to digital educational content and services

a. TVET institutions have access to diverse quality digital educational content and services for teaching and learning;

b. TVET institutions have offline access to digital educational content and services for teaching and learning;

c. TVET institutions have online access to digital educational content and services for teaching and learning;

d. A framework for zero-rating of access to digital educational content and services is established across all TVET institutions; and

e. A framework for zero-rating of access to digital educational content and services is operational across all TVET institutions.

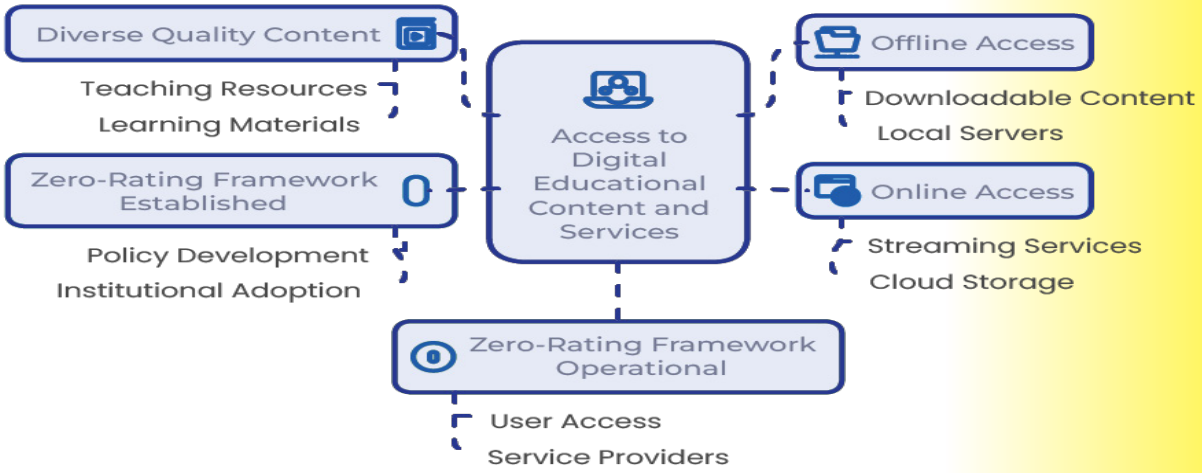


Figure 2: Access to digital education content and services

2.2 ICT Integration in the Curriculum

Integrating ICT into the curriculum is crucial for learners to achieve the digital competencies needed to succeed in the modern workforce, fostering innovation, and ensuring that the education system remains relevant and responsive to the evolving demands of the global economy. In view of this, the regulatory body shall ensure that:

2.2.1 Curriculum development and review

a. Occupational standards contain foundational digital literacy and specific digital skills;

b. All TVET institutions establish an ICT community of practice in which experienced ICT-proficient educators will act as mentors to support colleagues in adopting ICT in teaching and learning;

c. TVET institutions regularly review occupational standards to stay relevant to the current technological trends and labour market needs; and

d. TVET institutions deliver their programmes through appropriate technology-enabled modes (e.g., face to face, blended and online modes) to support flexible learning pathways.

2.2.2 Development and use of digital educational technologies

a. TVET institutions develop appropriate digital educational technologies (e.g., training kits, driving simulators, 3D printers, demonstration boards, information management systems, etc);

b. TVET institutions use appropriate digital educational technologies (e.g., projectors, smart boards, public address systems, etc); and

c. TVET institutions use approved online delivery tools (e.g., e-Mikutano, Google Classroom, Zoom, Team

Viewer, Skype and WhatsApp) for teaching and learning purposes.

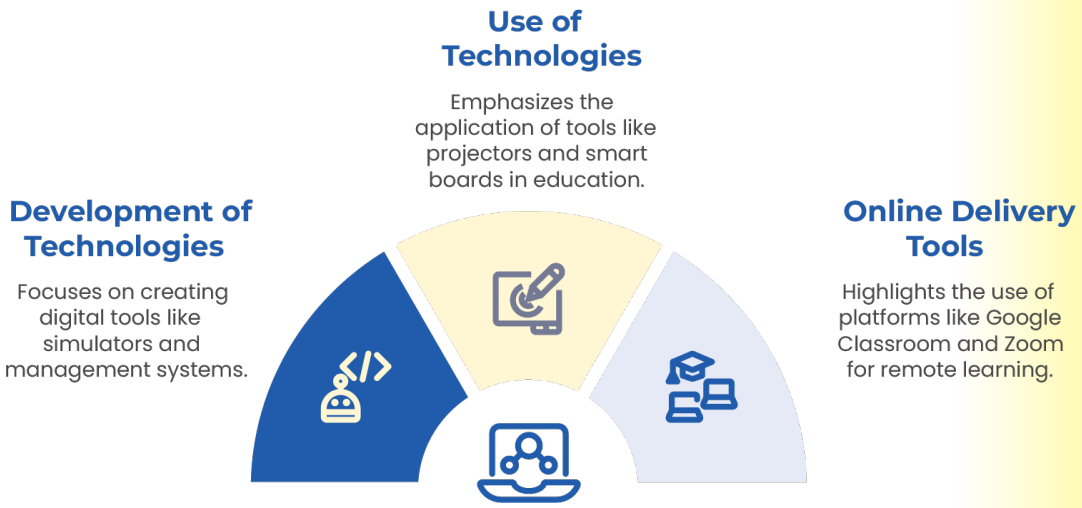


Figure 3: Digital Educational Technologies in TVET

2.2.3 Instructional design and learner engagement

a. TVET institutions adopt appropriate instructional design models to guide the integration of technology in teaching and learning (e.g. Technological Pedagogical Content Knowledge-TPACK, or Substitution, Augmentation, Modification, Redefinition-SAMR, etc);

b. TVET institutions use learner-centred learning approaches, using interactive and collaborative digital education technologies;

c. TVET institutions ensure diverse learning needs and styles of learners and educators are met when identifying, developing, procuring and deploying education technologies; and

d. TVET institutions use inclusive learning design frameworks (e.g. Universal Design for Learning (UDL)) in teaching and learning to ensure that digital technologies cater to diverse learning needs and styles.

Figure 4: Instructional Design and Learner Engagement

2.3 Digital Content Development

Developing quality digital content is essential for enhancing the learning experience, making education and training more engaging, accessible, and adaptable to diverse learning needs, while also ensuring that learners acquire the competencies necessary to thrive in a digital world. In view of this, the regulatory body shall ensure that:

2.3.1 Local digital content development

a. TVET institutions establish a multimedia studio for developing digital content for teaching and learning;

b. TVET institutions develop relevant, interactive, inclusive, compatible and local digital content to improve teaching and learning;

c. TVET institutions use the developed digital content to improve teaching;

d. TVET institutions guide learners on how to access digital content for learning purposes; and

e. TVET institutions develop procedures to protect ownership of the developed digital content.

2.3.2 Open educational resources and MOOCS

TVET institutions develop Open Educational Resources (OER) in compliance with the 5Rs-Retain, Reuse, Revise, Remix and Redistribute for teaching and learning;

a. TVET institutions build the capacity of educators to use readily available OER in teaching and learning;

b. TVET institutions comply with appropriate OER licencing regime (e.g. creative commons licences) in teaching and learning;

c. TVET institutions develop Massive Open Online Courses (MOOCs) for professional development of educators;

d. TVET institutions use the developed and available MOOCs for their professional development and for improving their teaching and learning practices;

e. Educational-related publications (e.g., e-books, notes, modules, etc) produced by TVET institutions and educators are disseminated through designed national digital platforms; and

f. TVET institutions use relevant and standard digital content in teaching and learning.

2.4 Digital Assessment

Digital assessment is critical for accurately measuring learners' competencies in real- time, providing immediate feedback, and fostering a more personalised learning experience that aligns with the demands of a digital economy. In view of this, the regulatory body shall ensure that:

2.4.1 Development and use of digital assessment tools

a. TVET institutions develop relevant and inclusive online digital assessment tools;

b. TVET institutions develop relevant and inclusive offline

digital assessment tools;

c. TVET institutions use inclusive online digital assessment tools (e.g., Moodle, Quizlet, and Socrative);

d. TVET institutions use inclusive offline digital assessment tools; and

e. TVET institutions involve parents and relevant stakeholders in the assessment ecosystem through collaborative online platforms.

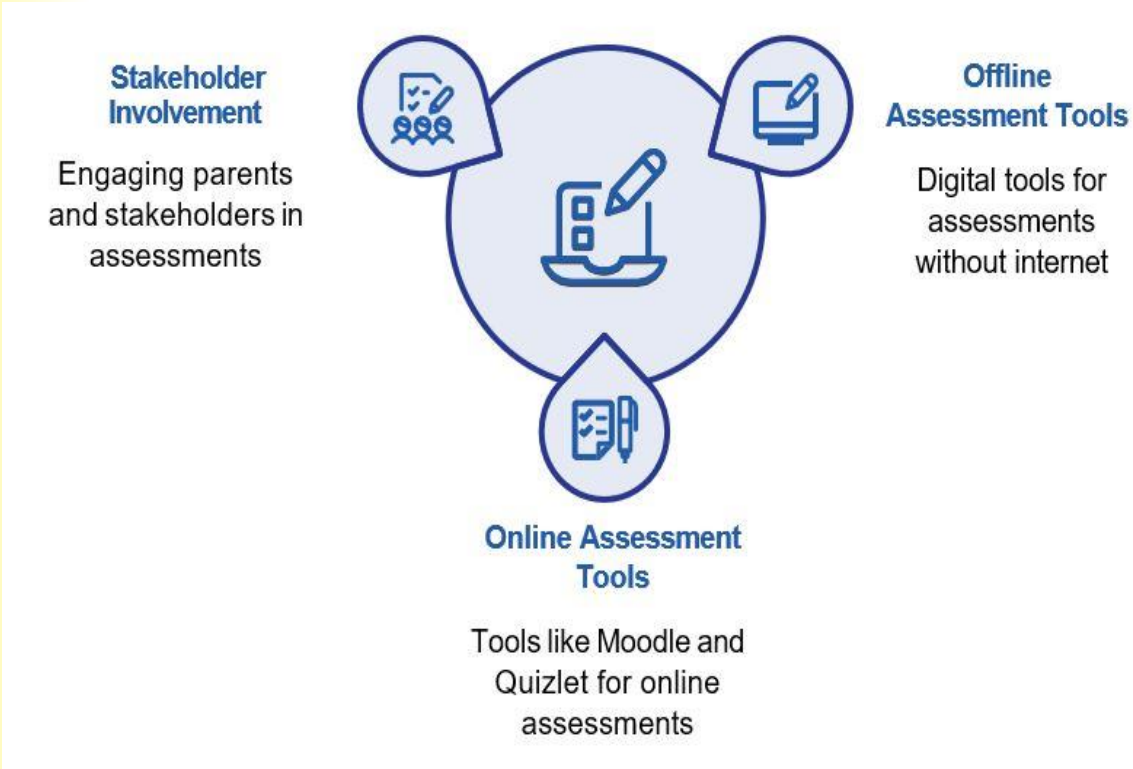


Figure 5: Enhancing Digital Assessment in TVET

2.4.2 Micro credentials and credit transfer

a. Establish procedures for acquisition and recognition of micro credentials within and across TVET institutions;

b. Establish procedures for recognising competencies accumulated through national and international blended and or online training programmes through hands-on

skills and practical assessment; and

c. Facilitate credit transfers across TVET institutions through an integrated digital platform.

2.5 Capacity building

Human resources and capacity building are essential for ensuring that pre-service and in-service educators as well as administrators are well-equipped with competencies needed to effectively integrate ICT in education, thereby driving the success of the TVET education system in a rapidly evolving technological landscape. In view of this, the regulatory body shall ensure that:

2.5.1 Technical ICT personnel

a. TVET institutions conduct annual skills gap audits on integration of ICT in education and training;

b. TVET institutions establish a staff development plan on skills (e.g. integration of animation in teaching and educational video editing) for integration of ICT in education and training; and

c. TVET institutions implement a staff development plan on integration of ICT in education and training.

2.5.2 ICT competency standards and digital literacy

a. ICT Competency Standards for educators in TVET institutions are developed.

b. TVET Institutions implement ICT Competency Standards;

c. TVET institutions develop programs for preparing competent personnel with good digital literacy and skills to support the integration of ICT in teaching and learning; and

d. Pedagogical programs for TVET educators contain skills for ICT integration in teaching and learning.

2.5.3 Digital resource centres

a. Establish an online digital resource centre to support educators and learners on the ICT integration in education and training;

b. TVET Institutions establish Resource Centres to support educators and learners on ICT integration in education and training; and

c. Establish national incubation centres for ICT related skills development and commercialization of innovations.

2.5.4 Staff continuous professional development and retention

a. TVET institutions develop tailor made continuous professional development courses on ICT integration in education and training for educators, administrators, technical staff and quality assurers;

b. TVET Institutions build the capacity of their educators on the integration of ICT in education and training;

c. Policymakers, Administrators and Quality Assurers are trained on the utilisation of ICT in education, training and management;

d. TVET Institutions build the capacity of their ICT personnel to support the integration of ICT in education;

e. Online Community of Practices (CoPs) for Continuous Professional

f. Development (CPD) are established across all TVET institutions;

g. TVET institutions build the capacity of educators to create MOOCs for their professional development;

h. TVET institutions build the capacity of educators to develop OER for teaching and learning; and

i. TVET institutions build the capacity of educators on development of relevant, interactive, inclusive, compatible and local digital content to improve teaching and learning.

j. TVET institutions establish retention and incentive schemes;

k. TVET Institutions implement the retention and incentive schemes to retain competent staff;

l. Training programmes related to ICT in education are recognised in the public scheme of service;

m. A framework for national and international staff exchange programs on the integration of ICT in education and training is developed for all TVET institutions; and

n. TVET Institutions implement national and international staff exchange programs on the integration of ICT in education and training.

2.6 Research, Innovation and Entrepreneurship

Research, innovation, and entrepreneurship are vital for fostering a culture of creativity and problem-solving, empowering learners and educators to develop new ideas and solutions, and driving the advancement of knowledge and economic growth within the digital economy. In view of this, the regulatory body shall ensure that:

2.6.1 Promote research, innovation and entrepreneurship

a. TVET institutions build the capacity of educators on inclusive research, innovation and entrepreneurship on the use of ICT in teaching and learning.

b. TVET institutions support research activities on the use of ICT in teaching and learning;

c. TVET institutions nurture innovations on the use of ICT in teaching and learning;

d. TVET institutions support entrepreneurial projects on the use of ICT in teaching and learning;

e. A framework for patenting and copyrighting research and innovations on digital technologies in TVET institutions is developed and implemented; and

f. A centralised online repository for research and innovations on ICT for TVE institutions is established and operationalized.

2.6.2 Institutionalise research, innovation and entrepreneurship

a. TVET institutions establish research and innovation units or functions on the use of ICT in education and training;

b. TVET institutions operationalise research and innovation units or functions on the use of ICT in education and training;

c. TVET institutions establish entrepreneurship units or functions to commercialise products and services from research and innovations; and

d. A centralised ICT research and innovation network is established across TVET institutions.

2.6.3 National research and digital innovation centres

a. A national research and digital innovation centre for promoting research and innovation for the use of ICT in education and training is established;

b. TVET institutions use the national research and innovation centre to promote research and innovation on the integration of ICT in education and training;

c. Facilitate national self-sustenance in the development and use of digital education technologies using the following approaches:

i. Providing short and long term local and international scholarships to Tanzanians on the development and use of digital educational technologies;

ii. Using the trained experts in developing educational technologies aligned to the context of Tanzania (e.g., through innovation hubs);

iii. Establish factories for assembling and manufacturing affordable digital devices for teaching and learning; and

iv. Ensuring that TVET institutions embrace the use of education technologies developed locally.

2.7 Emerging Technologies

Emerging technologies (AI, 3D printing, robotics, blockchain, Gamification, VR/AR, IoT, 6G etc) are crucial for keeping the TVET system at the forefront of educational advancements, preparing learners with appropriate digital competencies to navigate and excel in a rapidly evolving technological landscape, and ensuring that Tanzania remains competitive in the global digital economy. In view of this, the regulatory body shall ensure that:

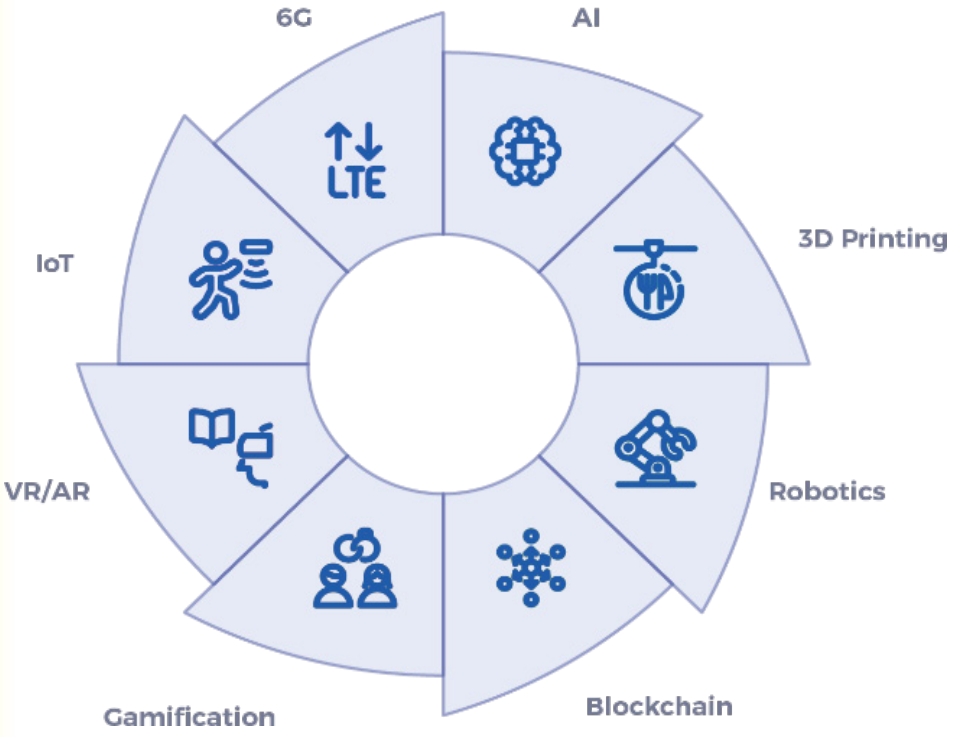


Figure 6: Advancing TVET with Emerging Technologies

2.7.1 Integration of emerging technologies

a. Occupational standards integrate emerging technologies;

b. Curricula for TVET institutions are integrated with emerging technologies modules;

c. A framework to enhance the utilisation of emerging technologies (e.g., AI, Virtual Reality (VR), Augmented Reality (AR)) for teaching and learning in TVET institutions is developed;

d. TVET institutions use the framework that enhances the integration of emerging technologies in education and training; and

e. Ensure that the best practices in the application of

emerging technologies in teaching and learning are shared and applied among TVET Institutions.

2.7.2 Development and use of emerging technologies

a. Ensure that appropriate emerging technologies are used in TVET institutions;

b. TVET institutions develop relevant emerging technologies for teaching and learning;

c. TVET institutions use relevant emerging technologies in teaching and learning;

d. Develop a national roadmap for research on development and utilisation of emerging technologies in education and training; and

e. TVET institutions implement a national roadmap for research on development and utilisation of emerging technologies in education and training.

2.7.3 Capacitating educators, technical personnel and the community

a. TVET institutions train their educators to develop and utilise emerging technologies in teaching and learning;

b. TVET institutions are familiarised with the use of emerging technologies in education and training;

c. Awareness campaigns to parents and communities on the use of emerging technologies in education and training are conducted; and

d. A forum on emerging technologies in education and training for TVET institutions is established.

2.7.4 Investment and partnerships in emerging technologies

a. Establish investment funds for supporting the development and use of emerging technologies in TVET institutions;

b. TVET institutions allocate annual budgets for supporting the development and use of emerging technologies;

c. Develop public-private partnerships framework to facilitate the use of emerging technologies in TVET institutions; and

d. Oversee the operationalization of the public-private partnerships framework of emerging technologies in TVET institutions

2.8 Change Management

Change management is essential for successfully implementing digital transformations within the TVET education system, ensuring that educators, learners, and institutions can adapt to new technologies and methodologies smoothly, and fostering a culture of continuous improvement and innovation. In view of this, the regulatory body shall ensure that:

a. TVETs institutions institutionalise digital integration in education through existing instruments such as strategic plan, annual budget, communication strategy, and management and education fora;

b. Establish a national framework for sharing best practices on the integration of ICT in teaching and learning across TVET institutions;

c. TVET institutions use a national framework for gathering and sharing best practices on the integration of ICT in teaching and learning;

d. Fora to share and discuss the integration of ICT in education and training are established and operationalized for TVET institutions and key stakeholders;

e. The existing guidelines and procedures across TVET institutions are reviewed and aligned with the national digital education strategy and guidelines for efficient and secure use of ICT in education and training;

f. TVET institutions have in place reviewed guidelines and procedures aligned with national digital education strategy and guidelines for efficient and secure use of ICT in education and training;

g. Awareness of digital resources on the national database curated from across all TVET institutions is conducted;

h. TVET institutions have in place Communities of Practice (CoPs) where experiences on the use of digital resources are shared;

i. TVET institutions conduct awareness campaigns on the use of ICT in education and training; and

j. TVET institutions establish and use fora to promote ICT integration in education and training.

2.9 Industry Collaboration and Partnerships

Strategic partnerships and mobilisation of resources are key to leveraging internal and external expertise, funding, and support, thereby enhancing the capacity of TVET institutions to implement and sustain digital education initiatives and achieve long-term educational and economic goals. In view of this, the regulatory body shall ensure that:

2.9.1 Collaboration and partnership

a. TVET institutions forge collaboration with stakeholders to ensure availability and equitable distribution of ICT resources for teaching and learning;

b. TVET institutions partner with local and international organisations to produce cost-effective digital education products and services;

c. TVET institutions capacitate their educators on the use

of digital platforms to facilitate collaboration and partnership on ICT in education and training;

d. TVET institutions mobilise resources from local, national and international development partners to support an inclusive ICT integration in teaching and learning; and

e. Budgets to support development, use and maintenance of digital technologies in TVET institutions are institutionalised within the existing funding mechanisms (e.g., capitation, education fund, projects).

2.9.2 Industry internships and apprenticeships

a. Establish a digital platform for internships, apprentices and job placements to promote collaboration between TVET institutions and the industry;

b. TVET institutions partner with local and international industries to provide internships and apprenticeships to educators and learners; and

c. Digital platforms on collaboration and partnerships on ICT in education and training are harmonised.

2.10 Governance, Management and Regulatory Framework

Governance, management, and regulatory framework are essential for ensuring effective administration, accountability, and adherence to standards, thereby facilitating the successful implementation and sustainability of digital education initiatives within the TVET education system. In view of this, the regulatory body shall ensure that:

a. TVET institutions establish dedicated sections/ units/ departments with a focus on ICT integration in education and training;

b. TVET institutions establish governance and management committees responsible for overseeing the integration of ICT in education and training;

c. Existing quality assurance standards are aligned with digital technologies integration into curricula for all TVET institutions;

d. Quality assurance standards for digital technologies integrated into curriculum development, implementation and assessment are established; and

e. Internal Quality Assurance Units across all TVET institutions utilise digital technologies in conducting quality assurance and control practices.

2.11 Data Management and Analytics

Data management and analytics practices are crucial for harnessing educational data to drive informed decision-making, improve learning outcomes, and optimise the efficiency and effectiveness of digital education programs within the TVET education system. In view of this, the regulatory body shall ensure that:

2.11.1 Education data management

a. Develop a centralised digital platform (EMIS) for collecting, storing, and sharing education data across TVET institutions and other stakeholders;

b. Operationalize a centralised digital platform (EMIS) for collecting, storing, and sharing education data across TVET institutions and other stakeholders;

c. Conduct awareness campaigns to TVET institutions and relevant stakeholders on the functions and importance of the EMIS platform;

d. Ensure the use of the EMIS platform by all TVET institutions;

e. Establish disaster recovery and business continuity procedures of data and information backup for TVET institutions; and

f. TVET institutions apply disaster recovery and business

continuity procedures for data and information backup.

2.11.2 Learning Analytics

a. Analyse digital education data collected from TVET institutions to improve teaching and learning across TVET institutions;

b. TVET institutions analyse the collected digital education data and use the results to improve teaching and learning;

c. TVET institutions conduct training of their staff on the usage of learning analytics to improve teaching and learning; and

d. TVET institutions use learning analytics to improve teaching and learning.

2.12 Security, Safety, Privacy and Ethics

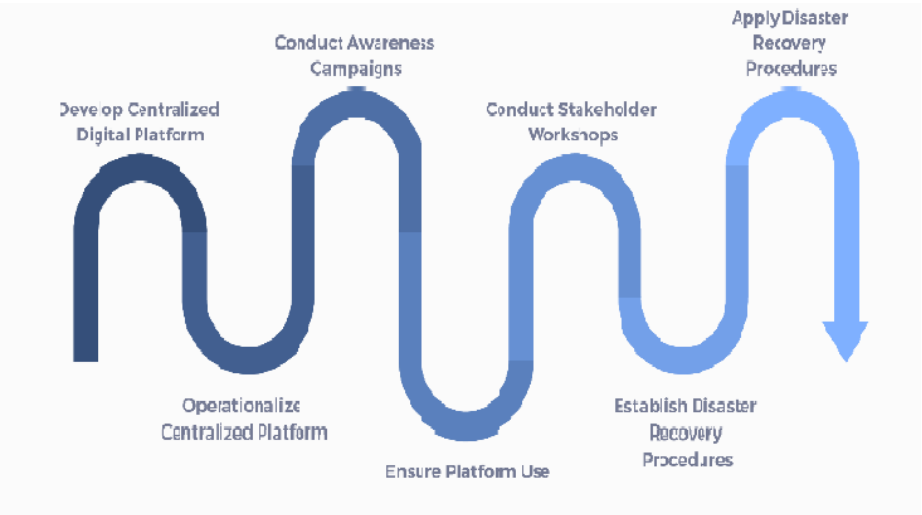


Figure 7: Implementation of EMIS for Education Data Management

Security, safety, privacy and ethics are essential for protecting sensitive educational data, safeguarding learners, educators and administrators, and maintaining trust and integrity in the implementation of digital education initiatives in the TVET education system. In view of this, the regulatory body shall ensure that:

a. Integrate inclusive security, safety, privacy and ethics modules in Occupational Standards;

b. TVET institutions integrate inclusive security, safety, privacy and ethics modules in their curricula;

c. TVET institutions have in place teaching materials for inclusive security, safety, privacy and ethics;

d. Develop inclusive standards and procedures to ensure confidentiality, integrity and availability of educational data across all TVET institutions and stakeholders;

e. TVET institutions comply with developed standards and procedures to ensure confidentiality, integrity and availability of educational data;

f. TVET institutions ensure that inclusive use of ICT resources is secure, safe and ethical and protects user privacy; and

g. TVET institutions comply with the national (e.g., Data Protection Act 2023) and Global Data Protection Regulation (GDPR) and privacy laws.

2.13 Technical Support and Maintenance

Technical support and maintenance are crucial for ensuring the continuous and effective operation of digital tools and infrastructure, minimising disruptions, and maintaining a reliable learning environment for learners, educators and administrators. In view of this, the regulatory body shall ensure that:

2.13.1 Management of digital assets

a. Digital asset register and management platform for TVET institutions is developed;

b. TVET institutions conduct regular preventive maintenance of digital assets and systems to support ICT in teaching and learning; and

c. TVET institutions establish and operationalise a

comprehensive mechanism on e-waste management for environmental sustainability and digital resource usage.

2.13.2 ICT technical support centres

a. A national platform to provide virtual assistance on common issues related to ICT integration in education is established;

b. TVET institutions utilise a national platform on virtual assistance on common issues related to ICT integration in education;

c. TVET institutions establish physical technical support centres to provide ICT Support to educators and learners;

d. A national technical support network for sharing best practices on using digital educational tools across all TVET institutions is utilised; and

e. A collaborative support platform among service providers and TVET institutions to ensure efficient ICT technical support is established.

2.13.3 Technical support reporting system

a. A national digital technical support and reporting system for all TVET institutions with an escalation mechanism is established;

b. TVET institutions utilise a national technical support and reporting system; and

c. TVET institutions provide feedback through national digital technical support and reporting system on technical support rendered to users.

2.14 Development and use of AI

The development and use of AI in TVET institutions may improve curricula delivery, enhances personalised learning, increases

administrative efficiency, and prepares students and educators for the evolving job market, with a strong emphasis on ethical considerations and data privacy. A comprehensive details of AI guidelines in education are provided in the National Guidelines for AI in Education 2024. In view of this, the regulatory body shall ensure that:

a. TVET institutions adapt and use AI tools and applications;

b. TVET institutions provide training for educators, administrators, and learners on the ethical and responsible use of AI in education;

c. TVET institutions conduct awareness campaigns through workshops and informational materials to learners, administrators and educators on the responsible use of AI in education;

d. TVET institutions advocate the importance of AI literacy and its integration into curricula;

e. TVET institutions integrate ethical AI literacy into the curriculum to help learners, administrators and educators understand the ethical implications of AI technologies in education;

f. TVET institutions ensure that AI tools and applications for assessment are transparent, fair, reliable, inclusive, explainable and safe;

g. TVET institutions ensure data privacy and security standards in the use of AI applications to protect data of educators, administrators and learners;

h. TVET institutions provide training programs on AI principles such as data privacy, bias mitigation, accountability, transparency, fairness and explain ability;

i. TVET institutions conduct hands-on workshops and seminars to gain practical experience on AI tools and applications;

j. Occupational Standards incorporates AI literacy and skills to equip learners with knowledge on how to use AI systems and tools;

k. TVET institutions integrate AI tools into the development of digital educational content to enhance interactivity, engagement, and personalised learning experiences;

l. TVET institutions provide technical support and training for educators and administrators to effectively use and manage AI tools and infrastructure;

m. TVET institutions participate in international collaborations and AI networks to learn and exchange best AI practices and advancements of AI in education and training;

n. TVET institutions provide professional development on the use of AI tools and applications to diversified groups to enhance equity and inclusivity in the education ecosystem;

o. TVET institutions establish partnerships with AI experts and technology companies for sharing resources and best AI practices in teaching and learning;

p. TVET institutions develop platforms for sharing research findings and best AI practices for teaching and learning;

q. TVET institutions encourage research and innovation as well as the adoption of AI tools in education and training; and

r. TVET institutions conduct reskilling and up-skilling of AI knowledge and educational research methodologies.

3.0 THE ROLES OF STAKEHOLDERS

Effective implementation of the National Guidelines for Digital Education for TVET require coordinated efforts from various stakeholders. Below are the detailed roles and responsibilities of each stakeholder group:

3.1 Ministry responsible for Education, Science, and Technology

The MoEST will serve as the primary authority in leading and overseeing the implementation of the Guidelines for TVET. Key responsibilities include:

a. Strategic Planning and Policy Development: Developing strategic plans and policies to guide the integration of digital technologies within TVET institutions. This includes setting objectives, timelines, and performance metrics to ensure alignment with national educational goals.

b. Coordination with Stakeholders: Coordinating with various stakeholders, including other government ministries, educational institutions, private sector entities, and international partners, to foster collaboration and ensure a unified approach to digital education.

c. Monitoring and Evaluation: Establishing monitoring and evaluation mechanisms to assess the progress of guidelines implementation, ensuring that TVET institutions adhere to the set standards and make necessary adjustments as required.

d. Policy Compliance: Ensuring that all TVET institutions comply with national policies and regulations related to digital education, including data protection, cybersecurity, and accessibility standards.

3.2 Ministry responsible for Regional Administration and Local Government Authorities.

The Ministry responsible for Regional Administration and Local Government Authorities will play a crucial role in the decentralised implementation of the guidelines. Responsibilities include:

a. Facilitation of Digital Infrastructure Deployment: LGAs will facilitate the deployment of digital infrastructure, such as internet connectivity and ICT equipment, in TVET institutions within their jurisdictions.

b. Compliance and Standards Enforcement: LGAs will ensure that local TVET institutions meet the required ICT standards and comply with the guidelines set by MoEST.

c. Feedback and Reporting: Local authorities will provide continuous feedback to MoEST regarding the implementation challenges, needs, and successes at the regional and local levels. This will help in refining strategies and addressing specific regional issues.

3.3 Ministry of Information, Communication and Information Technology

This Ministry of Information, Communication and Information Technology (MICIT) will collaborate closely with the MoEST to address the technical aspects of digital infrastructure in TVET institutions. Responsibilities include:

a. Infrastructure and Connectivity: Ensuring that all TVET institutions have access to reliable and high-speed internet connectivity, and that the necessary hardware and software standards are met.

b. Development of Digital Platforms: Supporting the development and implementation of digital platforms that facilitate online learning, resource sharing, and administrative functions within TVET institutions.

c. Cybersecurity and Data Protection: Implementing measures to protect digital infrastructure and data within TVET institutions, ensuring compliance with national cybersecurity policies.

3.4 Regulatory and Compliance Institutions

The National Council for Technical and Vocational Education and Training (NACTVET) will serve as the primary regulatory authority

overseeing the implementation of the National Digital Education Guidelines for TVET. NACTVET's roles and responsibilities include:

a. Regulation Enforcement: NACTVET will enforce the guidelines and standards set forth in the National Digital Education Guidelines across all TVET institutions. This includes ensuring that these institutions meet the required ICT infrastructure, digital content, and educational quality standards.

b. Accreditation and Certification: NACTVET will manage the accreditation and certification processes for digital education programs, platforms, and technologies used within TVET institutions. This ensures that all digital education tools and programs meet the necessary educational and technical criteria/ standard set.

c. Periodic Audits and Inspections: NACTVET will conduct regular audits and inspections of TVET institutions to monitor compliance with this National Digital Education Guidelines. These inspections will verify that institutions are adhering to the established standards and provide recommendations for corrective actions where necessary.

d. Quality Assurance and Continuous Improvement: NACTVET will implement quality assurance mechanisms to continuously assess the effectiveness of digital education in TVET institutions. This includes analysing performance data, gathering feedback, and adjusting regulatory frameworks to promote ongoing improvement in digital education delivery.

e. Reporting to MoEST: NACTVET will compile and submit detailed reports to the MoEST, outlining the compliance status of TVET institutions, the results of audits, and any recommendations for policy adjustments. This ensures that the regulatory framework remains aligned with national educational objectives.

3.5 Research and Innovation Institutions

Research and innovation institutions will play a pivotal role in advancing digital education within TVET systems. Their responsibilities include:

a. Development of Digital Tools and Practices: Contributing to the development of innovative digital tools, educational practices, and pedagogical approaches tailored to TVET education.

b. Research on Digital Education: Conducting research to assess the impact of digital education on learning outcomes, student engagement, and workforce readiness in TVET institutions.

c. Fostering Innovation: Promoting a culture of innovation within TVET institutions, encouraging the adoption of new technologies and teaching methods that enhance the learning experience.

3.6 Academic and Professional Development Institutions under the Ministry

These institutions will be responsible for the training and professional development of educators and administrators in TVET institutions. Their roles include:

a. Capacity Building: Providing targeted training programs for educators and administrators on the integration of digital technologies into their teaching practices and administrative functions.

b. Curriculum Development: Assisting in the development of digital education curricula that are aligned with industry needs and the national education strategy.

c. Professional Certification: Offering certification programs for educators and administrators who have completed professional development courses in digital education.

3.7 Institutions Responsible for Basic Education

Institutions involved in basic education will work in tandem with TVET institutions to ensure continuity and alignment in digital education practices. Their roles include:

a. Alignment of Educational Practices: Collaborating with TVET institutions to ensure that digital education practices are consistent and complementary across different educational levels, from basic education to technical and vocational training.

b. Transition Support: Providing support mechanisms for students transitioning from basic education to TVET, ensuring they are adequately prepared for digital learning environments.

3.8 The Tanzania Private Investors in Education

Private sector investors are encouraged to participate actively in digital education and training initiatives within TVET institutions. Their roles include:

a. Investment in Digital Education: Providing funding, resources, and expertise to support the integration of digital technologies in their TVET institutions.

b. Public-Private Partnerships (PPP): Engaging in public-private partnerships to co-develop digital education infrastructure, tools, and platforms that benefit both the private sector and the public education system.

c. Innovation and Technology Transfer: Facilitating the transfer of innovative technologies and best practices from the private sector to TVET institutions, ensuring they remain at the forefront of educational excellence.

3.9 The Media

The media plays a crucial role in raising awareness and promoting the National Digital Education Guidelines for TVET. Their responsibilities include:

a. Awareness Campaigns: Conducting awareness campaigns to inform the public about the benefits and opportunities of digital education in TVET institutions.

b. Highlighting Success Stories: Showcasing success stories and best practices in digital education to encourage adoption and inspire other institutions.

c. Public Information Dissemination: Providing accurate and timely information to the public regarding the progress and impact of digital education initiatives in TVET institutions.

3.10 Tanzania Private Sector Foundation (TPSF)

The Tanzania Private Sector Foundation (TPSF) plays a strategic role in fostering collaboration between the private sector and educational institutions to enhance digital education in TVET. Its responsibilities include:

a. Partnership Development: TPSF will facilitate partnerships between private sector companies and TVET institutions to support digital education initiatives. These partnerships can include funding, technology provision, and expertise sharing.

b. Resource Mobilisation: TPSF will engage private sector entities to mobilise resources for the deployment of digital infrastructure, development of digital content, and capacity-building programs for educators and students.

c. Advocacy and Policy Support: TPSF will advocate for favourable policies that encourage private sector investment in digital education and ensure that private sector needs are reflected in TVET curricula and digital education strategies.

d. Innovation Promotion: TPSF will support the introduction and scaling of innovative digital solutions and practices within TVET institutions, helping to bridge the gap between industry requirements and educational outcomes.

4.0 MONITORING, EVALUATION AND LEARNING

Effective monitoring, evaluation, learning and continuous improvement are critical to the successful implementation of the National Guidelines for Digital Education for TVET institutions. A comprehensive list of targets and indicators as aligned with these guidelines for monitoring and evaluating the efficiency and effectiveness of ICT integration in TVET institutions is provided in the implementation plan for the National Digital Education Strategy 2024/25 – 2029/30. In view of this, the regulatory body shall:

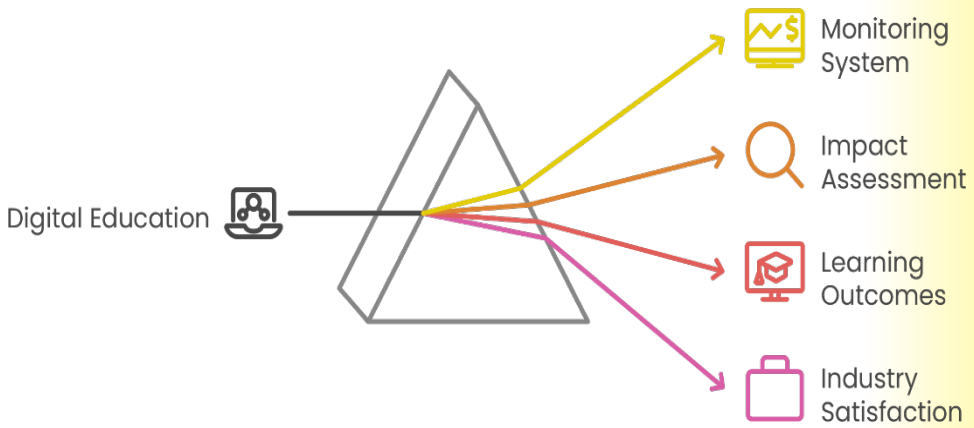


Figure 8: Targets and indicators for monitoring and efficiency evaluation

a. Establish a digital monitoring, evaluation and learning system aligned with NACTVET Quality Assurance and other reporting mechanisms to facilitate annual data collection, analysis and reporting to ensure effective implementation of these Guidelines.

b. Operationalize the digital monitoring, evaluation and learning system across TVET institutions.

c. Conduct impact assessment on how digital education initiatives are impacting learners' learning outcomes, job redness and industry satisfaction.

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MINISTRY OF EDUCATION,
SCIENCE AND TECHNOLOGY

Magufuli City - Mtumba, Afya Street
P.O. Box. 1040479
Dodoma, Tanzania

info@moe.go.tz
www.moe.go.tz