Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

Blended Learning Guidelines for Technical Secondary Schools (TSSs) in Rwanda

A TVET Trainer's Guide

April 2025

Preamble

The development of these Blended Learning Guidelines represents a significant milestone in the development of Rwanda's Technical and Vocational Education and Training (TVET) sector especially Technical Secondary Schools. These guidelines are an important tool for integrating innovative pedagogical approaches into technical secondary education to meet the demands of an increasingly dynamic labour market and contribute to the country's broader development agenda.

Rwanda's Vision 2050 aims to transform the country into a high-income economy driven by innovation, sustainability and inclusiveness. Central to achieving this ambitious vision is the development of human capital - a workforce equipped with the skills, knowledge and competencies needed to drive economic transformation. Technical and Vocational Education and Training (TVET) plays a key role in this effort, equipping individuals with practical skills that align with the evolving needs of the industry.

As outlined in the EducationSector Strategic Plan (ESSP), digitalisation is a cornerstone of Rwanda's strategy to modernise its education system. The integration of digital tools and blended learning methods promotes inclusivity, flexibility and efficiency in the delivery of education. Blended learning, which combines traditional face-to-face teaching with innovative digital tools, provides an adaptable framework for expanding access to quality education and improving learning outcomes across the country.

These guidelines have been developed through extensive consultations with educators, students, parents, civil society, policymakers and industry stakeholders to ensure that they address the unique needs of Rwanda's Technical Secondary schools. They serve as a comprehensive resource to guide the effective implementation of blended learning, models, technological requirements, digital skills for students and trainers required, curricula adaptations, and quality assurance among others. These guidelines are expected to improve teaching methods and expand opportunities for learners to develop the digital skills critical to success in the modern economy.

By embracing blended learning, Rwanda is not only equipping its youth with globally competitive skills but also fostering a culture of lifelong learning essential to achieving the goals set out in Vision 2050. These guidelines reaffirm the commitment of the RwandaTVET Board (RTB) to drive innovation and excellence in TVET, ensuring that no learner is left behind in the digital age

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Abbreviations and Acronyms

ADDIE: Analysis, Design, Develop, Implement and Evaluate
AI: Artificial Intelligence
AR: Augmented Reality
BL: Blended Learning
CBA: Competence-Based Assessment CBC: Competence-Based Curriculum
CBT: Competence-Based Training
ICT: Information and Communication Technology
LMS: Learning Management System
MINEDUC: Ministry of Education
NESA: National Examination and School Inspection Authority
OERs: Open Education Resources
RATA: Rwanda Assistive Technology Association
RTB: Rwanda TVET Board
RISA: Rwanda Information Society Authority
RP: Rwanda Polytechnic
RTTI: Rwanda TVET Trainer Institute
TSSs: Technical Secondary Schools
TVET: Technical, Vocational Education and Training
XR: Extended Reality
VR: Virtual Reality
UDL: Universal Design for Learning UNICEF: United Nations Children's Fund
UR: University of Rwanda
WCAG: Web Content Accessibility Guidelines

Acknowledgement

The Rwanda TVET Board (RTB) expresses its deepest gratitude to the Government of the Grand Duchy of Luxembourg for its unwavering support in advancing Rwanda's development agenda. Through its development cooperation agency, and the implementation of the Digital Skills for Quality TVET Project (RWA/027) by LuxDev in collaboration with the RTB, this project has been instrumental in improving digital and vocational education and training in Rwanda. Our special thanks go to the technical teams of LuxDev and RTB for their diligent efforts in coordination and inputs during the development of these guidelines implementing and coordinating this initiative.

Their commitment to excellence has ensured the successful implementation of key project activities in line with Rwanda's vision of a knowledge-based economy. The Ministry of Education (MINEDUC) provided critical policy guidance to ensure the blended Learning guideline's alignment with national education goals. Similarly, the Rwanda Information Society Authority (RISA) played a key role in integrating digital technologies into the TVET system, while the National Examination and School Inspection Authority (NESA) ensured that the guidelines met the highest standards of educational quality and assessment.

We also acknowledge the valuable contributions of development partners, including GIZ and the Digital Skills Foundation (DSF), whose technical expertise and resource alignment greatly strengthened the digital aspects and pedagogy and digital skills for teachers. The University of Rwanda, Rwanda Education Board (REB) and Rwanda Polytechnic (RP) /RTTI provided essential academic, best practices and research insights that enriched the implementation of blended learning strategies in TVET institutions.

Civil society organisations were also crucial to this initiative. Organisations such as Edified Generation, Rwanda Assistive Technology Association (RATA) and Seeing Hands have supported inclusivity, especially catering to all disability considerations in the guidelines, accessibility and professional development for teachers and learners alike. Their commitment to promoting an inclusive education system has been a cornerstone of this project.

Finally, we acknowledge the invaluable contribution of private sector representatives, who have ensured that vocational education and training programmes remain responsive to market needs, as well as teachers, students and parents, whose adaptability, enthusiasm and support have been essential to the success of selecting blended learning approaches. The leadership of the ChiefDigital Officer-MINEDUC and other policymakers has been crucial in championing blended learning guidelines, especially by providing insights on digital aspects and fostering an enabling environment for innovation in TVET. This collaboration on the quality of the guidelines' product demonstrated the power of collaboration and a shared vision. Together, we have laid a strong foundation for innovative, inclusive and digital initiatives under these guidelines, which will empower the technical secondary education system in Rwanda, a pathway to achieving the goals of Vision 2050.

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1. Introduction

To align with Rwanda's broader digital transformation agenda, TVET institutions and schools are encouraged to integrate Information and Communication Technology (ICT) for innovative teaching, learning and assessment, making TVET programs more relevant for the job market and the digital economy. The development of the Blended Learning Guidelines represents a significant milestone in the development of Rwanda's Technical and Vocational Education and Training (TVET) sector especially Technical Secondary Schools (TSSs). With the advancement of Information and Communication Technologies (ICTs), TSSs are also encouraged to adapt the way teaching, learning and assessment take place by integrating relevant digital content and EdTech tools.

TVET Trainers form TSSs are also encouraged to embrace an innovative teaching environment by following a paradigm shift from traditional in-class teaching and assessment to a modern blended learning environment. The purpose of the proposed blended learning guidelines is to provide guidance on the creation of a conducive and contextual blended learning environment in TVET schools in Rwanda through proper a integration of emerging technologies in teaching, learning and assessment practices.

To do so, these abridged blended guidelines are an important tool for trainers to integrate innovative pedagogical approaches into technical secondary education to meet the demands of an increasingly dynamic labour market and contribute to the country's broader development agenda. This trainer's version of the guidelines is inspired by the broad blended learning guidelines that have been also developed by RTB in collaboration with LuxDev for TSSs in Rwanda.

1.1. Laying the foundation for blended learning in TVET

The Government of Rwanda has made significant strides in ICT infrastructure, internet connectivity, digital skills development, and private sector growth in the IT sector. It has established a robust fiber-optic network, which ensures nationwide internet access and supports initiatives like 4G LTE expansion. Through programs like the Digital Ambassadors Program and ICT training centres, Rwanda has prioritised equipping its population with essential digital skills, including teachers. Additionally, the private IT sector has flourished, with Kigali emerging as a regional hub for innovation and start-ups, supported by government initiatives such as the Kigali Innovation City and partnerships fostering entrepreneurship and technology-driven solutions.

It is in this regard, Rwanda elaborated its TVET digitalization strategy that focuses on integrating digital technologies into teaching methods within the Technical and Vocational Education and Training (TVET) system, aiming to improve learning quality by utilizing blended learning approaches, providing digital literacy training for teachers, leverage on emerging technologies and developing online curriculum materials to transition towards a knowledge-based economy; this is primarily led by the Rwanda TVET Board (RTB) with a dedicated "Digital Technologies Division" to oversee implementation and curriculum transformation. To align with Rwanda's broader digital transformation agenda, TVET institutions and schools are encouraged to integrate Information and Communication Technology (ICT) for innovative teaching, learning and assessment, making TVET programs more relevant for the job market and the digital economy.

Through careful and thoughtful blending of courses, taking into account the level of digital and e-pedagogical skills, the level of digital infrastructure, and internet access, learning can now take place in any context for anyone. There is a need to consider different needs and learning styles of learners in the four-walled classroom, it is also vital to plan ahead and consider the enablers of a conducive blended learning environment and the associated barriers to digital learning. In this regard, blended learning guidelines are needed to support the design of courses for TVET schools to better prepare TVET students to learn and develop into a 21st-century global workforce that is relevant to the current digital marketplace.

1.2. Scope and objectives of blended learning guidelines

Secondary Schools in Rwanda. They will help educators, institutions, and policymakers design and implement blended learning approaches tailored to learner needs while addressing challenges like digital divides and resource gaps. In addition, the proposed blended learning guidelines aim to support TVET trainers to effectively integrate both traditional face-to-face and online teaching and learning methods by enhancing the quality of training. With these guidelines, TVET trainers in Rwandan Technical Secondary Schools (TSSs) will be able to design and create flexible, engaging, inclusive and accessible blended learning courses. Also, the proposed guidelines will provide clear guidance for TVET trainers on implementing E-assessment practices such as online quizzes, practical lab projects and demonstrations, and other digital assessments in a blended learning environment.

These guidelines accentuate the promotion of accessibility, inclusivity, and innovation in TVET programs while ensuring alignment with educational goals, labour market demands and a sustainable economy.

The following are the objectives of this version of blended learning guidelines:

- Adapt TSSs competence-based curricula to blended learning aligned specifically with local educational contexts and systems.
- Standardise practices and maintain quality across different courses or programs offered in a blended learning environment.
- Equip TVET trainers with the skills to effectively prepare and implement teaching/learning sessions using digital tools and emerging technologies.
- Ensure digital learning is accessible and inclusive for all learners (per gender, disabilities...).
- Align blended learning with curriculum competences needed on labour market.
- Foster innovation in teaching methods like flipped classrooms and student-centered learning.

With trainers' readiness, Rwandan Technical Secondary Schools (TSSs) will be able to design and create flexible, engaging, inclusive and accessible blended learning courses.

2. Understanding blended learning

2.1. Meaning, benefits and types of blended learning

2.1.1. Definition

Blended learning can be defined as an approach, a model, a process and or a strategy. Blended learning can be described as the combination of face-to-face instruction with computer-mediated instruction.

Staker & Horn perceive blended learning as a formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace (Staker & Horn, 2012). The definition insists on learner autonomy, stressing the importance of flexibility in how students interact with content.

Currently in the literature, blended learning is considered as an educational approach that combines traditional face-to-face instruction with online or digital learning activities, integrating the best aspects of both methods to enhance the teaching and learning experience.

Blended learning, once well integrated , provides flexibility in content delivery, supports personalized learning, and encourages active participation by leveraging technology alongside conventional classroom interactions.

2.1.2. Organisation of blended learning implementation in TVET Schools

The figure below describes the modes of delivery in implementing blended learning approaches in TVET schools.

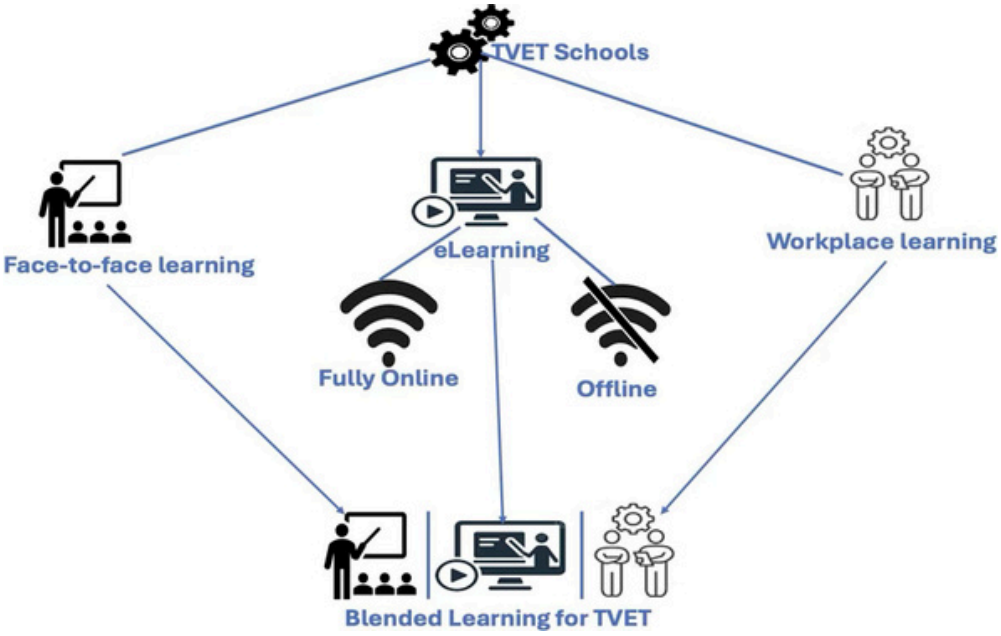


Figure 1. A combination of face-to-face and online instructor-led learning

As illustrated in figure 1 above, blended learning in Technical and Vocational Education and Training (TVET) combines face-to-face instruction with online, offline, and workplace-based learning. Students enrolled in TVET programs acquire theoretical knowledge and practical skills through in-class sessions guided by instructors, self-paced online or offline learning, and hands-on workplace experiences.

Workplace learning enables students to apply theoretical concepts in real-world settings, gain practical experience, and develop competencies tailored to their specific trades or professions. This process often includes workshop practices, internships, apprenticeships, on-the-job training, and collaborative, trade-specific professional work experiences. These structured opportunities bridge the gap between classroom or online learning and actual workplace demands, enhancing students' job readiness.

In some TVET environments equipped with advanced technologies, training, learning, and assessments integrate innovative tools such as simulations, virtual reality (VR), augmented reality (AR), mixed reality (MR), artificial intelligence (AI), and multimedia content creation platforms. These tools enrich the learning process by providing immersive and interactive experiences, ensuring students are well-prepared for the dynamic demands of their chosen professions.

2.1.3. Types of blended learning models

Blended learning can be adopted depending on different school context, teachers' digital literacy, students' digital skills, trade requirements and available ICT infrastructure. Institutions and schools may use a model of their choice provided that it is aligned with their curricula and courses. As described by Clayton Christensen Institute and citedby Hashim & Hamidon (2022), there are 4 main blended learning models (Rotation Models, Flex Model, A La CarteModel, Enriched Model) The known blended learning models are the following:

1. Rotation Models,

2. Flex Model,

3. A La CarteModel,

4. Enriched Model

a) Station Rotation Model	Groups of learners in a course or subject can move between various learning stations on a fixed schedule or based on the teacher's discretion.
b) Lab Rotation Model	This model allows learners' groups to rotate through different learning physical environments such as science lab, computer lab, maker space, etc...
c) Individual Rotation Model	This model allows learners from the same class or subject to rotate only to the learning activities that are scheduled by instructors. This means that a class is grouped according to learning activities and each group has its turn for face-to-face as well as online.
d) Flipped Classroom Model	With this model, students first explore new course content outside a class by watching a pre-recorded lecture video or digital module, or by completing a reading or preparatory assignment. In-class time is organised around student engagement, enquiry and assessment, allowing students to engage with, apply and elaborate on course concepts.
e) Flex Model	With this model, students first explore new course content outside a class by watching a pre-recorded lecture video or digital module, or by completing a reading or preparatory assignment. In-class time is organised around student engagement, enquiry and assessment, allowing students to engage with, apply and elaborate on course concepts.
f) A La Carte Model	This model provides a learner-centred approach that allows students to design their own learning experience by choosing their own learning subjects or content to be delivered through online classrooms and supplementing it with school-based courses.
g) Enriched Virtual Model	This model puts more emphasis on creating an online learning environment as the primary mode of delivery with periodic in-class instruction of face-to-face teacher-leaner interactions. It allows students to complete most of their coursework online but also attend in- person sessions or labs for practical, and hands-on training

The blended learning models described briefly above are the most discussed ones in the literature. However, teachers are given the flexibility to choose or combine any of them depending on the school context and course type.

3. Blended Learning models applicable to TVET system

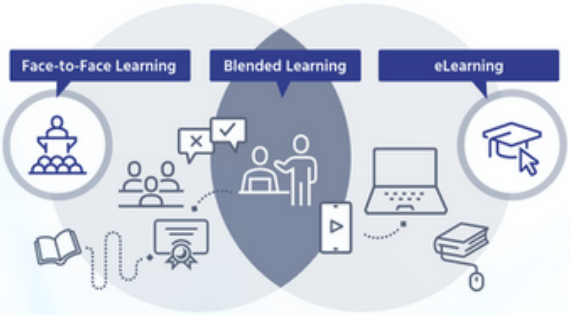


Figure 2. From F2F and eLearning to Blended Learning

In Technical and Vocational Education and Training (TVET) blended learning models integrate particularly face-to-face instruction, digital tools, and workplace-based experiences to provide a holistic learning approach (Owston, York & Murtha, 2013; Garrison & Vaughan, 2008).

These models combine theoretical knowledge, practical skills, and real-world applications, ensuring students are well-prepared for their professions (Hashim & Hamidon,2022). These models can be summarised as follow:

- ***Learning in the classroom and workshop enhanced with technology:*** Where main teaching and learning activities take place at the school premises (in classrooms, workshops and computer labs). Technology can be integrated mainly to improve the quality of learning and teaching.

- ***On-the-job training supplemented with classroom, distance and online learning:*** With this model, learners attend some theory-based lectures in the classroom and some other learning activities online. Thereafter, learners can then engage in apprenticeships at the workplace and TVET schools can assess learners at distance and the workplace to ensure coherence and quality of the apprenticeship.

- ***Fully distance and online learning:*** This model suggests that general, mostly theoretical, skills can be acquired regardless of a specific context. Considering that practical skills are the core part of TVET, this board model suggests that these skills can be developed at the learners' home or workplace. This model is more flexible and self-paced with minimum instructor intervention and support.

By leveraging technology and hands-on training, blended learning enhances flexibility, engagement, and job readiness for TVET students. The level of technology to be integrated in blended learning will depend on the trade and different subjects to be covered in a particular TVET course.

4. Adapted blended learning model for TSSs in Rwanda

The fully distance and online learning mode cannot be applied to all the practical TVET courses since schools may not have all the technology required to complete practical parts such as virtual labs or workshops. On-the-job training supplemented with classrooms, distance and online can be suitable for dual training programs in TVET which also has been started in Rwanda. Learning in the classroom and workshop, enhanced with technology can be adapted to suit the local context of TSSs.

In the current TSSs programs' context, the Rwanda TVET competency-based model emphasises on establishing the requirements for imparting students with soft skills, theoretical and practical knowledge.

In this regard, the proposed adapted blended learning model for TSSs has been thoughtfully adjusted to address the unique challenges and opportunities of the TSSs context in Rwanda (***See Figure 3***).

With a mix of boarding and day students, including students from remote areas with limited access to devices or the Internet, the model ensures flexibility and inclusivity for all learners.

The proposed adaptable model for blended learning recognises also the aspects of shared computer labs, rotational schedules between classrooms, workshops, and workplace attachments which provide hands-on learning experiences for all students, including those with disabilities.

Recognizing the limited IT infrastructure and internet in some remote schools, offline digital content and low-tech solutions are also highly prioritized.

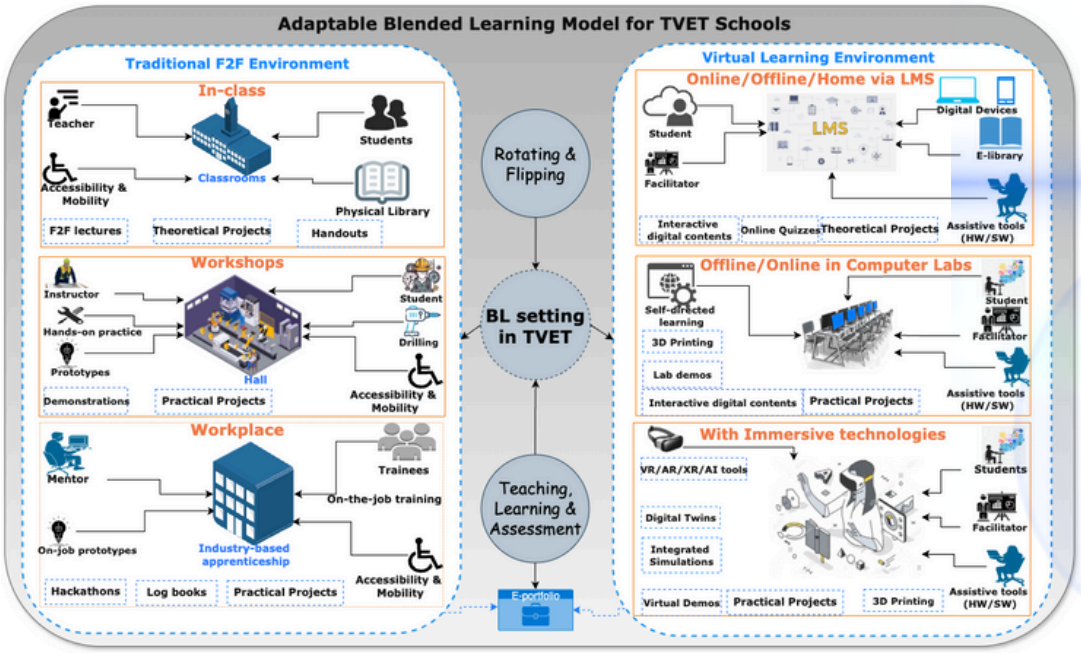


Figure 3. Adapted Blended Learning Model for TVET Schools

The model in Figure 2 illustrates how blended learning can be designed to meet the current needs of TSSs programs and study time, ensuring effective integration of blended learning into the existing TVET system while fostering equitable access to resources and opportunities for all learners.

The above proposed blended learning model has been designed based on the assessment findings from the pilot TSSs (both rural and urban areas). The implementation of this model will follow the following processes:

- ***Rotation and flipping teaching, learning and assessment activities:*** As TSSs lack adequate infrastructure such as computer labs, smart classrooms and workshops, the proposed adapted blended learning model entails that some lecture sessions will be rotated in these premises to allow all learners and trades to equally benefit from these infrastructures.
- ***Hybrid Course Design:*** This model suggests that TVETschools should deliver theoretical content such as lectures, readings, and assessments via LMS and other digital communication tools like Zoom, Google Meet and MS Teams. This allows for self-paced learning, flexible schedules, and access to additional resources such as videos, chats, discussion forums, and quizzes). Also, the model proposed learning offline at home, and thus, lectures and demonstrations will be recorded and uploaded for students to watch asynchronously. In addition, the model suggests also that the interactive materials should encourage student engagement.
- ***Appropriate digital infrastructure:*** This model proposes that digital infrastructure and devices such as laptops and desktops, smartphones and tablets should be in place. A specialised LMS integrated with digital tools for inclusion shall be accessible byteachers and students with less effort. LMS should be designed to support both the delivery of interactive digital content and the management of online assessments, asynchronous forums, live sessions, and resource sharing.
- ***E-portfolios and Logbooks:*** The proposed model suggests that both tools will be essential for tracking students' progress, reflecting on their learning experiences, and providing evidence of their skills development both online and offline. As shown in Figure 2, E-portfolio portals will serve as digital collections of TVET student work, reflections, assessments, and progress over time. E-portfolios will be typically used to document achievements, skills, and competencies acquired throughout the training period from both the F2F environment and the Online learning environment. As for the logbooks, these will be used by TVET students to document their internships and apprenticeship practices and skills acquired at the industry- based workplace or during the workshop sessions.
- ***Integrating assistive technologies and resources***: This model also suggests that assistive tools and resources will be established at TVET schools to enable hybrid learning. For the F2F learning environment, accessibility and mobility in physical spaces will be ensured for TVET students to easily move in classrooms and workshops.

On the other side, assistive technologies and applications will be used on LMS, in computer lab tools and in the immersive learning environment to cater for diversity and inclusion for all TVET students.

- ***Promoting practical hands-on training (Offline & Online):*** This adapted blended learning model promotes the use of workshops and computer labs for practical hands-on sessions for TVET students which is very important for TVET curriculum. Where feasible, the model encourages the use of virtual labs or simulations for skills that may not require direct physical presence. The model also echoes the design of learner assessments where TVET students demonstrate practical skills. These proposed assessments in this model include practical projects, case studies, or lab-based activities using simulation tools and digital twins.

The proposed Blended Learning Model for TVET Schools in Rwanda can be a tool to support in:

- **Rotation and flipping teaching, learning and assessment activities**
- **Promoting Hybrid Course Design**
- **Appropriate use of digital infrastructure**
- **Integrating E-portfolios and Logbooks**
- **Integrating assistive technologies and resources**
- **Promoting practical hands-on training (Offline & Online)**

5. Accessibility and inclusivity in blended learning environment

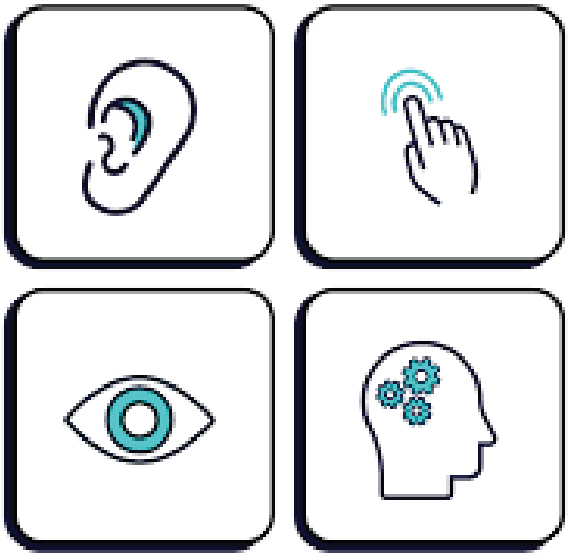


Figure 4. Accessibility and inclusivity in Blended Learning

Prior to designing and delivering a TVET curriculum, an assessment of learner types and categories has to be conducted to prepare for inclusion and diversity. Learner disability and gender are critical considerations in the blended learning curricula for TSSs in Rwanda.

Figure 5. Gender inclusion

5.1. Considerations on disability in blended learning environment

UNICEF for example proposes that before introducing blended learning in the classroom, it is crucial to assess learners' needs and identify appropriate equipment and software for them to engage in all learning activities (UNICEF, 2024). The UNICEF framework can support schools to make inclusive and accessible choices with digital content to address a range of visible and hidden disabilities.

This framework, presented in Table 1 below, categorises different types of disability such as vision, hearing, mobility, neurodivergent, and cognitive and mental health problems.

Table 1. Types of disability, inclusion and accessibility choices

Disability	Video	Audio	Presentations	Interactive Activity
Vision	• Provide transcripts (for screenreaders)	• Provide transcripts • Use clear audio	• Use alt text • Use Built in headings • Use large font sizes	• Make sure content can be navigable via keyboard • Links are descriptive • Use audio indicators for feedback
Hearing	• Provide subtitles • Provide transcripts (for spoken narration)	• Provide transcripts	• Insert sign language video • Include captions in embedded video	• Use visual indicators for feedback • Avoid audio only commands
Neurodivergent & Learning	• Use adjustable speed	• Balance narration and background sound • Provide transcripts • Use clear audio	• Clear, structured layouts • Use animations sparingly • Use clear direct instructions • Avoid misc graphic elements • Use visual aids	• Allow users to set their pace. • Use clear direct instructions • Avoid locked navigation • Untimed assessments & retakes
Mobility	• Access with assisted device or screenreader • Provide sufficient time for all user interactions without time constraints.	• Access with assisted device or screenreader	• Make sure kids can access learning with an assisted device and/or screenreader	• Access with assisted device or screenreader • Large well spaced touch points • Avoid drag-and-drop • Untimed assessments • Allow retakes of assessments
Mental Health & cognition	• Offer control over sensory inputs (e.g., ability to mute) • Avoid potentially triggering content without warnings.	• Provide transcripts	• Use calming colors and avoid flashy animations. • Provide clear, direct information without overcrowding	• Allow users to set their pace. • Offer break reminders

Source: UNICEF, 2025

When designing a TVET curriculum, all types and levels of disability are recorded and included in the course design, and they will be considered during the course delivery. By following the UDL guidelines (CAST, 2025) and assuming that everyone has the right to grow and thrive, all types of disability can be accommodated in a blended learning environment. Specific considerations for disabilities include:

1) Physical disabilities:

- For example, trainers may ensure that the keyboard used by learners is user-friendly and the LMS navigation is compatible with all appropriate assistive tools/software in place.
- ***In-class sessions, workshops or computer labs***: These learning spaces have to be designed to enable easy movement and ensure the spaces are easily workable. Otherwise, the school should provide motorised lifts or lightweight tools to reduce physical strain.

2) Sensory disability:

- ***On visual impairment:*** Trainers can use tactile markers on tools and machinery and provide verbal cues and hands-on guidance during training sessions.
- ***For hearing impairment:*** Trainers may offer captioned contents for audio-visual formats. Sign language interpretations and real-time transcriptions may also be provided for learners in need. It would also be important to use visual alerts when providing instructions and alarms in classrooms, workshops and labs.

3) Cognitive disabilities:

- Trainers are encouraged to use simplified (step-by-step) instructions and straightforward language with visual and verbal reinforcement. Visual aids such as diagrams, mind maps may be used also to explain complex concepts
- Trainers should also allow extra time for task completion and provide frequent reminders and prompts. Accordingly, it is important also to provide visual schedules and checklists for task organisation to support focus and memory when delivering the course.

4) Neurodivergent learners (e.g., Autism):

- Trainers may for example allow for using sensory regulations tools such as noise cancelling headphones or stress balls.
- Trainers may also use role-play or simulations to practice workplace interactions
- It is important also use LMS with capabilities for learners to customise their LMS interface such as colour scheme and layouts).

5) Emotional or behavioural disabilities:

• Trainers should incorporate learning activities that build emotional intelligence and self-regulation for those who may feel overwhelmed

• It is crucial also to provide opportunities for learners' reflection and self-paced learning to reduce stress.

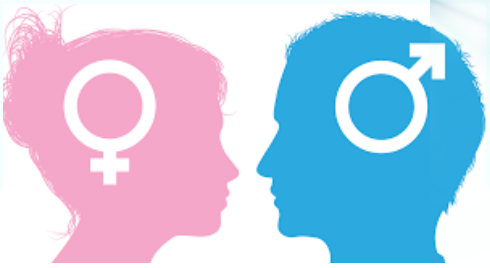
• Trainers should also offer regular check-ins and provide timely feedback that emphasizes strengths and confidence.

6) Language and communication barriers:

• Trainers should provide multilingual support in course content, LMS and other digital tools to be used in blended learning environment

• It is also important to use icons, symbols, graphics alongside text-based content to convey meaning.

Hence, the design and delivery of TVET curriculum in a blended learning mode can consider mainly the following three aspects as proposed in the UDL guidelines.



5.2. Gender consideration in blended learning

The current TVET curricula, at least in TSSs, do not specify different needs, preferences, and challenges those individual learners face, based on their gender.

When adopting blended learning in TSSs, it is important that the curricula be gender responsive. This entails that the adaptable pedagogy to deliver blended learning courses will ensure that teaching, learning and assessment approaches, strategies, and practices actively recognize and address the gender-related needs, experiences, and inequalities of different genders.

Trainers will implement gender-responsive pedagogy in blended learning environment by considering the following aspects:

When adopting blended learning in TSSs, it is important that the curricula be gender responsive.

Figure 6. Focus areas of Gender Consideration in Blended Learning for Technical Secondary Schools

More details on how inclusive gender consideration in blended learning in TSSs is provided in table below:

Table 2. Consideration of Gender in Blended Learning Environment

Area of focus	Gender-Responsive Strategy	Example of Implementation
1. Gender inclusive Content	Ensure that all learning materials (online and offline) are gender-neutral and reflect diverse gender perspectives.	Use textbooks, pictures, videos, and case studies that highlight the contributions of both men and women in technical fields.
2. Train trainers on gender-responsive pedagogy	Ensure TVET trainers are equiped with gender responsive skills	Train a pool of trainers at each TSS on gender responsive pedagogy and create a related community of practice (CoP) across TSSs
3. Participation equity	Encourage equal participation from all genders, both in classrooms, workshops and online environments.	• Monitor classroom discussions to ensure both male and female students have equal opportunities to speak. • In online forums, encourage active participation from everyone.
4. Gender-sensitive language	Use inclusive, non-biased language in all teaching materials, course content, and communication.	Avoid using gendered pronouns unless necessary, and use terms like "students" or "learners" instead of "guys" or "girls."
5. Safe Learning spaces for all	Create safe and supportive environments in the physical classroom, workshops and online, free from gender-based harassment or discrimination.	• Implement a zero-tolerance policy for gender-based harassment • Ensure moderators are available to oversee online discussions to prevent bullying.
6. Diverse learning tools	Use a variety of teaching tools that cater to diverse learning styles and experiences, ensuring gender inclusivity in both physical and virtual spaces.	Provide online resources such as videos, graphics, interactive simulations, and digital textbooks that reflect diverse gender roles.
7. Gender-responsive assessment	Design assessments that do not favor one gender over another, ensuring fairness in evaluation.	• Create assessments that are free from gender bias, • Offer multiple ways for students to demonstrate their knowledge (e.g., written, oral, practical).
8. Reflection on gender roles	Include discussions and activities that encourage students to critically reflect on societal gender roles and stereotypes within their field of study.	For example, in a course about building construction: • Initiate discussions about gendered stereotypes (e.g., women in STEM), • Challenge students to explore non-stereotypical roles.
9. Digital tools for gender inclusivity	Use technology to create an equitable learning experience, providing tools that support diverse needs and promote gender inclusivity.	Integrate accessible learning platforms that provide features like text-to-speech, language options, and adaptive learning paths for all students, regardless of gender.
10. Gender-based mentorship and support	Provide mentorship opportunities that address gender disparities, ensuring both male and female students have equal access to role models and guidance.	• Pair male and female students with mentors of any gender, • Ensure that students have a variety of role models and guidance within their chosen fields.
11. Gender-inclusive group work	Organize group work in a way that ensures equal participation from all genders, avoiding stereotypes and biases in group task assignments.	Ensure that groups are formed in a way that encourages mixed-gender collaboration and that all students contribute equally to projects.

5.3. Steps for digital content development with UDL guidelines

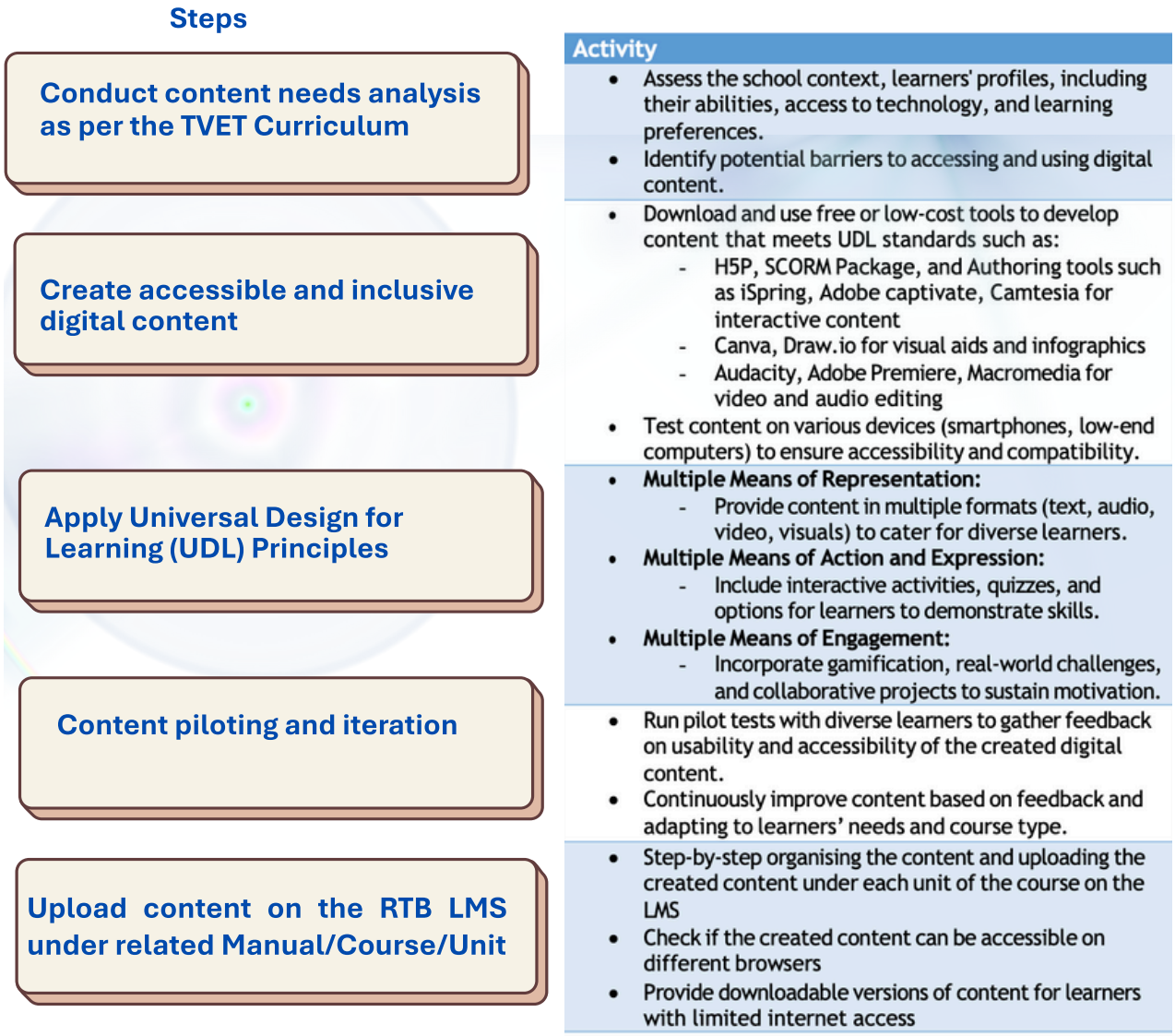


Figure 7. Proposed steps for digital content development using UDL Guidelines

6. Blended learning course creation: A TVET school perspective

As we design courses concerning learning objectives, learner diversities, status of available digital infrastructure, digital tools and other school-based contexts, it is paramount to consider a deliberate approach to the design of technology-supported learning experiences to ensure the success of blended learning.

For TVET Schools, a careful and holistic approach should be selected to ensure that the opted technology enhances the learning experience, meets the specific needs of students, and aligns with the institutional and national goals of TVET programs.

Such a holistic approach may entail aligning appropriate technology with trade-based curricula and related learning outcomes, accessibility, diversity and equity, hands-on practical learning, user-centred approach interactive and collaborative learning, innovative learner evaluation and assessment, instructor and learner support, privacy and security, and trade-based industry involvement among others.

Considering all the above aspects for effective blended learning integration in TVET schools, and the available learning design models in the literature, we propose a five-step process (***Figure 4***) for creating quality blended learning courses and improving learning experiences for TVET students.

This proposed process is inspired by the ADDIE Model which stands as (Analysis, Design, Development, Implementation and Evaluation).

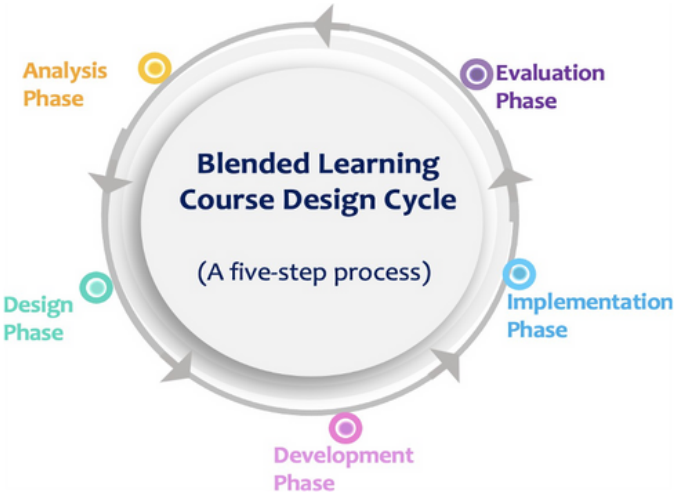


Figure 8. Proposed framework for blended learning course creation, inspired by ADDIE Model

Following the steps of the ADDIE model as a guide to blended learning course design for TSSs, figure 4 above is proposed as a framework to guide trainers of TSSs in Rwanda on how they can organise their courses by considering a blended learning environment. TVET trainers will follow this five-step process for blended learning course design. A more detailed description and guidance on how Trainers will apply this five-step process for blended learning course creation is provided below.

6.1. A five-step process for blended learning course creation

Phase 1: Analysis

The Analysis phase is a starting point for effective blended course design by TVET Trainers. This phase focuses mainly on gathering and analysing critical information that will inform the next phases of the course preparation and delivery. The goal of this phase is to understand the learning needs, objectives, constraints, and the learners' needs. This phase sets the foundation for the entire course and helps ensure that it aligns with the desired outcomes. A breakdown of what TVET Trainers will do during the analysis phase is presented below:

1. Learner analysis and needs:

- Trainers will determine the skills, knowledge, and competencies learners need to acquire in the blended course (Learning objectives).
- Trainers will also analyse students' prior digital literacy, access to technology, familiarity with technology, and learner needs for Face-to-face and virtual learning environments.

2. Trade-based industry analysis:

- Trainers will conduct needs assessment on the current job market in comparison with trade-industry relevance.
- This will be done for example, by analysing industry demands, consulting with employers, or reviewing job descriptions to identify key skills required in the field.

3. Technology & digital tools analysis:

- Trainers will navigate the school LMS that hosts the TVET courses and assess its functionalities and features to host their planned course content such as textbooks, graphics, animations and video resources.
- Asses technological readiness such as internet access, and devices available for students
- Trainers will also assess the course and align the course materials with these immersive technology tools and create an alignment towards learner access to their courses and digital content. Learning Outcomes.
- In addition, trainers will assess the assistive tools/solutions integrated with the school LMS to support diversity and inclusion in their courses.
- Trainers should also analyse the expected theoretical and hands-on TVET skills/knowledge/ competencies to be acquired by students in the blended learning environment and those to be acquired in-class, in workshops and at the workplace.

4. Content analysis:

- Trainers will analyse and determine if the course will involve theoretical, Practical and industry exposure.
- At the same time, they will also assess their course content to decide on which part is to be delivered in self-paced online, in-class, labs, workshops or at the workplace.
- Trainers will also assess the course content to ensure it is inclusive, accessible and can accommodate learners' diversities and preferences.

Phase 2: Design

During the design phase of a Blended Learning Course, TSS Trainers take the insights gathered from the previous analysis phase and start to structure and organize their blended learning course.

The design phase involves creating a detailed blueprint for the course, determining the instructional strategies, selecting the appropriate technologies and planning the course layout for both online and face-to-face components. The goal is to create a cohesive, engaging, and effective learning experience for students. As a trainer, you should perform the following activities during the design phase.

1.Mapping the course structure and sequence:

- Trainers will map out the overall structure and sequence of the blended learning course.
- Trainers will also define the main topics, subtopics, and how they will be delivered across online and offline sessions.
- Following the course plan, trainers will design their blended course using a blended learning strategy.

Trainers will for example design their BL courses with:

- ***Face-to-face learning activities*** *(In-class sessions, Lab sessions, Workshop sessions and industry-based sessions)*
- ***Online learning activities*** *(Discussion Forums, Lab Demos, Simulations)*
- ***Synchronous*** *(Live) vs* ***asynchronous*** *(Self-paced) course delivery*
- ***Physical*** *vs* ***online*** *assessments tools and exams.*

2. Assessment strategy (Safe and proctored):

- Trainers will design different assessments such as quizzes, individual and group projects, lab demos and simulations.
- Considering the type of the course, trainers will for example design:
  - ***Formative Assessment*** *(Online or Offline practical, Theoretical or Practical)*
  - ***Summative Assessment*** *(Online or Offline, Theoretical or Practical)*
  - ***Proctoring mechanisms*** *to be considered during virtual learner assessment.*

3. Design Levels of interaction (online or face-to-face):

Trainers will design their BL course to ensure a high level of interaction by considering:

- *Peer-to-peer, Instructor-Learner, learner–content interactions*
- *Learner / Instructor Support Mechanisms in Blended Learning Environment.*

4. Mechanisms and tools for promoting diversity & inclusion:

- Trainers will design and avail tools and mechanisms for supporting diverse learners and needs.
- The designed tools and mechanisms will be aligned with available assistive technologies and resource rooms at the TSS.

5. Plan instructional strategies and learner engagement:

- Trainers will select strategies such as flipped classrooms, problem-based learning, collaborative learning, or direct instruction.
- Trainers will also plan strategies like interactive quizzes, gamification, discussion prompts, and real-time feedback to enhance student engagement.

6. Content delivery formats and technology readiness:

- Trainers will design their course contents in diverse digital formats.
- They will review the digital tools and platforms that will support the online components of the course. For example, trainers will consider tools for communication, collaboration, content delivery, and assessment.
- Instructional designers and multimedia experts will assist TSS Trainers in designing relevant content formats such as:
  - *Multimedia content (Text, Audio, video, simulated with VR/AR/XR, & AI generated*
  - *Adapted hands-on practice, case studies and projects in related TVET fields.*

Phase 3: Development

During the development phase of a Blended Learning course for TSS, the main focus will be on creating and preparing all the course materials and activities that will be used in both online and face-to-face components of the course. Below is a detailed description of what TVET Trainers will typically :

1. Create TVET Course Content and materials:

- **Develop both digital and physical learning materials:** This includes for example e- books, graphics, videos, slide presentations, interactive content, simulations, OERs, and practical assignments for both online and face-to-face learning. *The created digital content* should be accessed by all types of learners
- ***Create hands-on activities:*** For TVET courses, practical tasks are essential. Trainers create assignments or projects that allow students to apply their technical skills, both online (through simulations, virtual labs, etc.) and in person (via workshops or workplace activities).

- ***Inclusive content:*** Trainers ensure that before availing the content to students, all content and materials are inclusive and gender-neutral, reflecting a diverse range of perspectives and avoiding biases or stereotypes.

2. Develop Instructional Learning Activities:

- ***Interactive learning activities:*** TVET Trainers develop engaging and interactive activities, both for online and in-person learning. Created learning activities should promote active participation. These can include discussions, quizzes, group work, and problem-solving tasks.
- ***Blended Learning Activities:*** For effective blended learning adoption, TVET trainers ensure that activities are well-balanced between online and face-to-face components. For example, online discussions can be supplemented with in-class workshops, or virtual labs can be complemented by practical tasks in a workshop setting.

3. Develop Learner Assessments & Evaluation tools:

- ***Create Online and Offline Assessments:*** Trainers can design both formative and summative assessments that can be delivered in a blended learning environment. This could involve quizzes, practical exams, assignments, E-portfolios or peer-reviewed projects.
- ***Rubrics and Feedback Mechanisms:*** Trainers may design assessment rubrics that clearly outline how students will be evaluated. Additionally, feedback mechanisms are created at this phase to provide timely and constructive feedback to students.

4. Select and Prepare Technologies and Tools:

- ***Learning Management System (LMS) Setup***: Trainers set up and develop the course on the RTB LMS where students can access materials, submit assignments, and track their progress.
- ***Enrol students into the course:*** Trainers enrol students into the course and also ensure that the platform is user-friendly and accessible to all students.
- ***Set up other digital tools:*** TVET trainers integrate other technologies such as virtual labs, simulation tools, and tools for synchronous and asynchronous collaboration such as MS Teams, Zoom, Google Meet, Google Docs, Padlet, Mentimeter, etc. Also, learner analytics tools should be integrated in the course to monitor engagement and progress as the course is being implemented
- ***Testing the Tools:*** Trainers test all technological tools to ensure they work seamlessly for both in-person and online components. These includes ensuring compatibility with different devices (laptops, tablets, smartphones) and troubleshooting any potential issues.

5. Create Supportive Resources for Learners

- ***User Guides and Tutorials:*** Trainers work with instructional designers and E-learning officers to develop guides for students on how to navigate the online components of the course, including how to use the LMS, access materials, submit assignments and participate in online activities.
- ***Technical Support:*** Trainers ensure that students have access to technical support for both hardware and software issues. This might include creating FAQs or instructional videos for a blended learning environment.
- ***Student Engagement Strategies:*** Trainers design engagement strategies to keep students motivated in both face-to-face and online learning. This may include gamification, student progress tracking, and opportunities for interaction between student-teacher and student-student.

Phase 4: Implementation

During the Implementation Phase of a Blended Learning Course following the ADDIE Model, TVET trainers focus on delivering the course to students while ensuring that the learning environment (both online and offline) are properly set. This phase involves putting the course plans, content, and tools created in the Development Phase into action and ensuring that students can effectively engage with and benefit from the developed course. Below are key activities under this phase of implementing a TVET course in a blended learning environment.

1. Deliver TVET course content:

- Trainers present the course materials and facilitate learning in both the online and face- to-face components of the course. Example: Conduct live classes with MS Teams, upload content on the LMS,
- These course materials should be engaging, clear, and aligned with the course's objectives.
- Trainers also might ensure that all content is accessible to TVET students with different learning needs.

2. Facilitate online learning:

- Trainers manage and guide students through the online components of the blended learning course, ensuring engagement and participation. Example: Monitor online forums, host virtual office hours, and facilitate live webinars or group discussions on platforms like MS Teams, Webex or Zoom

3. Facilitate in-person learning

- Trainers can lead practical, hands-on training in the physical classroom or workshop setting to ensure students gain the necessary skills and knowledge.
- They may also conduct workshops, lab sessions, practical exams, or group activities where students can apply technical skills in real-world scenarios in their specific trade.

4. Continuously assess and evaluate student learning

- Trainers implement learners' formative assessments and provide timely feedback to students on their performance.
- Formative assessments should align with the blended learning objectives and address both theoretical and practical learning outcomes.
- Continuous assessments are conducted during the BL course progress to make real-time improvements.
- For TVET courses, these assessments are ideally done by conducting online quizzes, assignments, practical tests and live demos, or course projects.
- At this level, trainers collect feedback from students regularly by using for example, quizzes, polls, student reflections, or informal discussions.
- These tools provide real-time data that can inform modifications during the course such as adjusting teaching approaches, content, or teaching pace.
- Trainers can also use rubrics or E-portfolios, Hackathons to ensure fair and transparent assessment of student work.

With an effective continuous conducting of formative evaluation of learning, trainers may be able to adjust teaching methods, revising the content, or learning pace. For example, *if students are struggling with a particular concept, the trainer may revisit the topic or offer additional resources through both offline and online channels.*

5. Monitor student progress

- Trainers track and assess student engagement and progress in both online and face-to- face environments
- Trainers use LMS analytics to monitor student activity, completion rates, participation, and performance on course assessments.
- Trainers also use both physical and virtual attendance to monitor student participation in the course learning activities
- Trainers can identify at-risk students early and provide necessary interventions, such as additional resources, in-person support, or peer coaching.

6. Provide ongoing student support

- Trainers make themselves available for support, offering help with technical issues (e.g., logging into the LMS) or academic challenges (e.g., understanding content).
- Trainers should also offer a variety of channels for students to seek support (e.g., email, forums, in-person office hours, peer-coaching hours or virtual meetings).

7. Ensure functionality of digital tools

- Trainers need to ensure the available digital tools and platforms that host the course are functioning well.
- This includes checking that the LMS is accessible, video conferencing tools are working properly, and that students have no trouble navigating the online elements of the course.
- Being assisted by the technical team, trainers Troubleshooting any technical issues promptly is essential for maintaining a smooth learning experience.

8. Foster a safe and inclusive blended learning environment

- Trainers should ensure that the blended learning environment is free from harassment and that students feel safe and supported. This includes, for example, addressing any instances of bias or discrimination and fostering inclusivity in group work or discussions.
- Gender-responsive and culturally sensitive teaching practices should be implemented by trainers to ensure equity.

Phase 5: Evaluation

During this phase, the main focus will be to assess both the effectiveness of the course and the achievement of its learning objectives. This phase involves collecting feedback, analysing data, and making adjustments to improve future iterations of the course. The blended learning course evaluation phase may occur after the course has concluded (summative evaluation). Below is a breakdown of what TVET trainers typically should do during the blended learning course evaluation phase:

1. Conduct summative course evaluation:

- Review course outcomes, such as student success rates, dropout rates, and career progression after the course.
- Evaluate the overall effectiveness of the course after its completion to determine whether the learning objectives were met.
- Analyse final assessments, student performance, and feedback to assess overall course success and areas for improvement.
- Feedback from students is collected for example through post-course surveys to determine satisfaction and outcomes.
- Distribute end-of-course surveys, conduct interviews or focus groups, or use feedback forms to gauge student satisfaction.

2. Analyse learner performance:

- Trainers should assess individual and group performance on both theoretical and practical assessments.
- They should also review quiz results, practical exams, assignments, and learner participation rate to identify trends in student performance.

3. Assess teaching effectiveness and review of digital tools

- Trainers reflect on the delivery of the course to evaluate the effectiveness of teaching methods, tools, and technologies used.
- They also perform self-reflection and peer reviews regarding the teaching approach, content delivery, and learner engagement and difficulties.
- Trainers may also analyse whether the LMS, virtual labs, video conferencing tools, and other digital tools worked effectively and were user-friendly.

4. Assess inclusive and gender responsiveness

- Trainers evaluate if all students had equal opportunities to participate in the course.
- They may also assess whether there were any gender biases, and if the course content was inclusive enough and addressed diverse learning needs.

5. Make improvements for future course delivery

- Based on evaluation results; trainers identify areas for course improvement to enhance future iterations.
- Trainers may for example adjust content, update resources, modify assessment strategies, or improve learner support based on evaluation data.
- Overall, trainers may use data from evaluations to continuously improve the course, teaching methods, and learning experience, taking into consideration the theoretical skills and knowledge, practical hands-on competencies and student readiness for trade-based jobs.

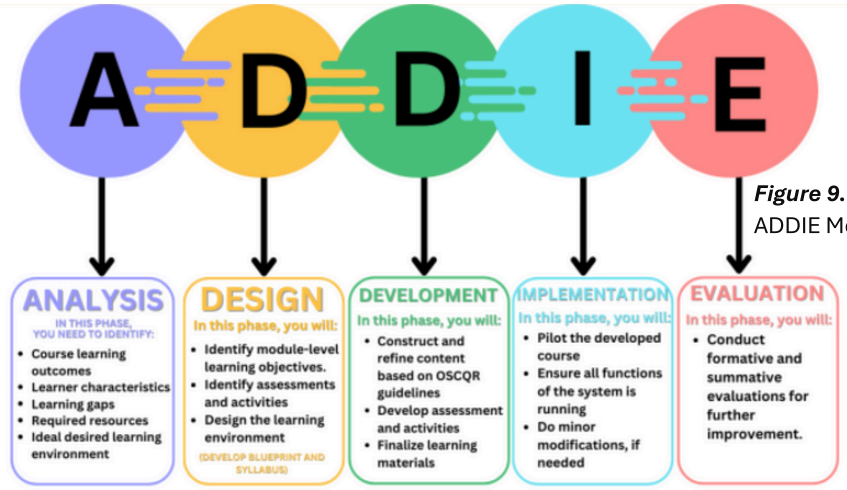


Figure 9. ADDIE Model

"Overall, while TVET trainers are advised to follow the above-proposed blended learning course creation framework, other key aspects should also be considered for the effective blended learning environment in TSSs." The ADDIE Model is highly adaptable to blended learning course creation for TSSs considering specific school context as it postulates a structured yet flexible framework for combining online and face-to- face instruction across all phases (*See Figure 5 and 6*).

By systematically:

- Analysing the school context, learner needs and preferences,
- designing blended learning strategies,
- Developing engaging content, implementing diverse learning formats,
- Implementing well-designed courses
- And evaluating learning outcomes,

Each school can create an effective blended learning environment that prepares TVET learners for the workforce with both theoretical and practical hands-on skills and competencies

6.2. Other key aspects for consideration when creating a blended learning course

6.2.1. Accessibility to digital tools and technology level

- In TSSs, students and trainers have different **characteristics** in terms of **technology access** and level of **digital readiness** for adopting blended learning

6.2.2. Imparting practical hands-on skills

- In TVET program or course, a crucial emphasis is on practical, **hands-on learning** activities. Trainers consider - ***Blended Project works*** and ***Instructor-led demonstrations***

6.2.3. Industry-relevant and student-job readiness

- Trainers must consider that technology, course design and digital content reflect the **industry standards** for specific TVET trades

6.2.4. Consideration on skill and competence assessment

- In TVET, (CBT) and (CBA) are critical to equip students with relevant skills and knowledge for the **market and real-world application**

6.2.5. Consideration on learner diversity

- Trainers should keep in mind that TSS schools receive students with **diversities** in terms of **gender and disability levels.**

Figure 8. Further Considerations for blended learning course creation

7. Proposed Category-based Guides for Blended Learning

This chapter introduces three specific guides for trainers' effective implementation of blended learning in Technical Secondary Schools (TSSs) in Rwanda. It covers key areas including the adaptation of curricula and teaching manuals and digital content development and selection. These guides provide a structured approach for TSS trainers to integrate digital and face-to-face learning, ensuring a seamless transition that enhances both teaching efficiency and student learning outcomes.

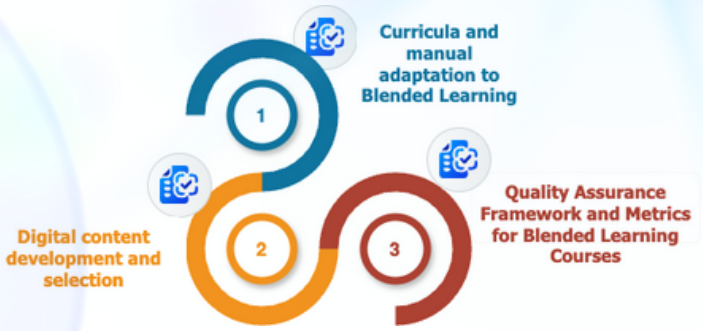


Figure 10. Three guides for TVET trainers to implement blended learning

7.1. Guides on curricula and manual adaptation to Blended Learning

7.1.1. Curriculum development and adaptation to blended learning

To adapt the current TVET curricula and ensure they can be implemented in a blended learning mode, it is very important to provide guides on the extent to which online and offline teaching, learning, and assessment activities will be conducted.

The adaptation of the TVET curricula to the blended learning environment also entails self-paced learner engagement and interaction with trainers, peer- students, and content. Based on the situational analysis conducted at the pilot TSSs and the consultations with different TVET partners in Rwanda, the ratios of offline and online activities need to be assessed for each course considering the differences between practical and theoretical components.

The proportion of online versus offline activities may vary depending on the specific trade, curriculum, and course/manual requirements; the availability of digital (blended learning) infrastructure at a given TVET school; and learner diversity, including disability categories, needs, and preferences. Additionally, the resources to implement the CBT/CBA curricula should indicate the technology tools to support blended learning. Annex i provides a sample of CBT/CBA blended learning-adapted curriculum.

(1) Adaptation of TVET-CBC Curriculum General Information Template

The ***information template*** for the Competency-Based Curriculum (CBC) is a structured document that guides the design, development, and implementation of TVET curricula, ensuring alignment with industry needs, educational standards, and the competencies required in various technical and vocational fields.

To effectively integrate blended learning within the TVET-CBC Curriculum, the template must be adapted to reflect a balanced combination of online and in-person learning while maintaining the integrity of competency-based training and assessment.

The adapted curriculum should outline key components such as program overview, student competencies and learning outcomes, blended module structures, teaching methodologies, required resources, and blended assessment strategies. Additionally, the template should incorporate digital competencies, employability skills, and environmentally responsible ICT practices. To ensure the effective adaptation of TVET curricula to blended learning, the following guidelines are proposed:

- ***Specification of digital tools and infrastructure:*** The curriculum should clearly define the necessary digital tools, platforms, and infrastructure required to support a relevant blended learning environment for TVET courses.

- **Structured online and offline content delivery:** The curriculum framework should propose some contents that can be provided online. Eg: which lecture sessions and theoretical concepts can be delivered online, which content requires in-person instruction (e.g., practical workshops or labs), and the aspects designated for on-the-job training.

- **Modular and flexible course design:** Content should be broken into smaller, manageable modules to allow for self-paced learning and flexibility in course delivery.

- **Integration of blended learning assessments:** Assessment methodologies should incorporate a mix of digital and traditional evaluation methods, ensuring that competencies are effectively assessed in both online and offline learning environments.

- **Defined learning activities and assessments:** The curriculum should explicitly indicate which learning activities and assessments will be conducted online and which will be administered offline.

- **Identification of supporting technology resources:** The curriculum should specify the required technology tools and resources that will facilitate blended learning, such as LMS platforms, e-learning content, and digital collaboration tools.

- **Gamification strategies for engagement:** To enhance student motivation and participation, the curriculum should include gamified learning elements, such as interactive challenges, badges, and leaderboards.

- **Monitoring and evaluation framework:** A structured approach should be incorporated to track the implementation of blended learning, ensuring continuous monitoring, feedback mechanisms, and necessary improvements.
- **Integration of blended learning in Existing TVET curricula:** The Rwanda TVET Board (RTB), in collaboration with TVET schools, should initiate the integration of online learning components into existing curricula to facilitate a seamless transition to blended learning.

Moreover, the adapted Curriculum Information Template specify the sections that will have to indicate online and offline facets for a particular TVET course. These sections are:

- The program overview,
- Students' competencies and learning outcomes,
- Module or Unit structure (in blended delivery),
- Teaching and learning strategies,
- Resources (materials and equipment)
- Assessment methods.

In the adapted CBC Curriculum Information Template, these sections include both online and offline aspects. Note that a sample of the adapted CBC Curriculum General Information Template integrating digital tools and resources is submitted to RTB and can serve a reference when trainers develop their TVET courses.

In that template, sections like employability and life skills, and computer skills for students were adjusted to include digital competencies.

These skills include:

- *Effective online communication,*
- *Independent work in online settings,*
- *Awareness of health and environmental considerations such as ergonomics and green ICT.*

(2) Instructional strategies towards curricula adaptation

Ensuring effective blended learning implementation in TVET schools requires the application of appropriate instructional strategies that align with the Competency-Based Training (CBT) and Competency-Based Assessment (CBA) curricula. These strategies should leverage technology to integrate theoretical knowledge with hands-on practice, ensuring learners develop industry-relevant skills. By adopting a blended learning approach, TVET schools can enhance flexibility, engagement, and accessibility while maintaining the hands-on nature essential for technical education. The following ***instructional strategies*** are proposed to effectively blend TVET CBT/CBA curricula:

- **Flexible learning structure:** theoretical content, such as videos, texts, and readings, should be assigned for self-paced online learning, while practical training, problem-solving exercises, and discussions should be conducted in physical settings like workshops or computer labs.
- **Defined delivery modes:** each training manual should specify the mode of delivery for different units, clearly indicating which components will be delivered online, offline, or face-to-face to ensure a structured and seamless learning experience.
- **Balanced online and face-to-face learning:** Theoretical concepts should primarily be delivered online, whereas practical skills training should take place in traditional face-to-face sessions to preserve the hands-on nature of TVET education.
- **Synchronous and asynchronous learning**: Online lecture sessions should incorporate both live (synchronous) and self-paced (asynchronous) methods to allow personalized learning experiences and accommodate diverse learner needs.
- **Utilization of digital platforms:** Trainers should use digital tools such as Learning Management Systems (LMS) for recorded lectures, online quizzes, and assignment management, as well as video conferencing tools for live sessions. Collaborative tools should also be used for group discussions, peer feedback, and teamwork projects.
- **Engaging multimedia content:** Learning should be enriched with videos, animations, interactive simulations, and digital libraries to make theoretical content more engaging and accessible to all learners.
- **Blended apprenticeships and internships:** Work-based learning should integrate online modules and e-portfolios, allowing students to document and reflect on their experiences while receiving virtual support and guidance.
- **Mobile-friendly learning materials:** Digital content should be optimized for mobile devices, ensuring learners can access course materials anytime, anywhere, whether at school or home.
- **Gamification for engagement:** To enhance motivation and learner participation, gamification elements such as leaderboards, achievement badges, and rewards should be incorporated into the learning process.
- **Adaptive learning based on LMS analytics**: Trainers should monitor learner progress through LMS analytics and adapt instructional approaches accordingly to meet individual learning needs.
- **Advanced immersive technologies:** With advancements in digital learning, Virtual Reality (VR), Augmented Reality (AR), and Extended Reality (XR) could be also integrated into manuals to provide hands-on practical skills training in a safe and controlled environment.

When TSSs implementing these instructional strategies, TVET schools can create an effective blended learning environment that enhances learner engagement, ensures competency development, and aligns with industry demands.

7.1.2. TSS Course Manual Adaptation to Blended Learning

A manual content template is a blueprint that is used by TVET institutions to organize and present the content of a course or module. It is a guide for both instructors and students, ensuring that the TVET course is coherent, comprehensive, and aligned with the learning objectives.
In transition to blended learning in Technical Secondary Schools (TSSs), the course manuals must be adapted alongside the TVET curricula. This adaptation should encompass session plans, trainers' schemes of work, and course content to ensure that both theoretical and practical components are effectively delivered in a blended learning format. The following key actions are necessary for the adaptation of course manuals to blended learning:

- **Integration of digital tools and resources**

1. Manuals should include objectives requiring trainers and trainees to use digital tools in teaching, learning, and assessment.
2. Clear guidelines on how digital tools and resources will be integrated into lessons must be specified.
3. Learning outcomes should explicitly indicate how they will be achieved in a blended learning format.

- **Structuring learning content for blended delivery**

1. Manuals must clearly distinguish which learning activities that are possible to be conducted online and those that requires face-to-face interaction.
2. Course content should be broken into smaller, manageable units, each with well-defined learning outcomes, activities, and resources.
3. Online materials should be interactive, using tools like H5P and SCORM, supported by PDFs, PPTs, audio, and captioned videos.

- **Standardized course content and LMS integration**

1. All course manuals should follow an RTB-approved template for consistency. Possibly, LMS may have template to be filled for harmonization purpose.
2. The course manuals must include a cover page with course details, learning outcomes, prerequisites, and assessment methods.
3. Course content should be uploaded to the RTB LMS in a standardized format for accessibility.

- **Specification of learning modes and required resources**

1. Manuals should indicate whether a unit will be delivered online, offline, face-to-face, or through workplace placements.
2. Equipment, tools, and materials necessary for blended learning should be clearly outlined.
3. Additional references and resources should be provided in both course syllabi and the LMS.

- **Accessibility and optimization for low-bandwidth environments**

1. Digital content should be optimized for low-bandwidth areas, with compressed multimedia formats (MP4 for videos, JPEG/TIFF/PNG for images).
2. Manuals should promote the use of Open Educational Resources (OER) under Creative Commons licensing.

For TSSs in Rwanda, the Module (Manual) Content Template has been adapted to create guidance to TSS trainers on where to include elements of blended learning in their courses. The adaptation of the Manual Content Template focused on revising the learning outcomes. Starting on the later, they need to start with reformulation, to include how these learning outcomes will be achieved in a blended learning mode. Additionally, the section of implementation materials has been also adapted to align with the resources required for achieving the learning outcomes in a blended learning environment.

Accordingly, resources required in terms of equipment, tools and materials for TSS students to achieve learning outcomes have been also proposed in the adapted Manual Content Template to reflect the blended learning approach.

The sections of Formative and Summative Assessments have been also adapted with guidance on elements to be considered to adapt the manual with blended learning features. The adapted Module Content Template is provided in ***Annex 3*** of these blended learning guidelines.

7.1.3. Adaptation of scheme of work and session plan for blended learning

Adapting the curricula and manuals for TVET courses need also to be done in line with the review and adaptation of the trainer's scheme of work as well as the session plan template. These two templates are important to highlight online aspects which will guide trainers during the planning and delivery of their courses.

(1) Adaptation of the scheme of work for blended learning consideration

A scheme of work is a structured plan that helps trainers organize teaching activities in advance. It serves as a forecast of learning activities that trainers consider suitable for a particular class, ensuring that the curriculum is covered effectively within a specific teaching period. The scheme of work structures content delivery in a timely manner, aligning with the school calendar and curriculum requirements.

The current TVET scheme of work template does not explicitly define how online learning activities, digital tools, and technology-enhanced resources should be incorporated into blended learning. To ensure an effective transition to blended learning, the scheme of work must be adapted to include both face-to-face and online learning components. This adaptation ensures that trainers effectively plan, integrate, and utilize digital tools and resources while maintaining the competency-based approach of TVET. To make the scheme of work fully aligned with blended learning, specific sections must be revised to incorporate online and face-to-face elements:

i. Equipment, Tools, and Resources (ETR)

- Clearly list the digital tools, platforms, and technologies required for blended learning.
- Specify whether resources will be used in an online setting(LMS, virtual labs, e- books) or in face-to-face practical sessions (workshops, lab equipment, physical tools).

ii.Evidence of Assessment

- Define how formative and summative assessments will be conducted in both online and in-person settings.
- Identify digital assessment tools such as online quizzes, e-portfolios, and competency-based practical evaluations.

iii. Indicative Contents (Key Learning Elements)

- ***Learning Activities:*** Distinguish activities meant for online (interactive videos, simulations, discussion forums, self-paced exercises) from those delivered in face-to-face settings (practical workshops, hands-on skill demonstrations).

- ***Learning Resources:***
  - Specify digital learning materials, such as SCORM packages, H5P interactive content, PDFs, PowerPoint presentations, videos, and e-library references.
  - Include additional physical materials required for hands-on learning.

- ***Learning Place:***
  - Define where each learning activity will take place—whether in an online environment (LMS, virtual classrooms) or in a physical setting (workshops, industry placements, school labs).

A revised scheme of work with consideration of blended learning can be found on ***Annex 1*** for these guidelines.

By explicitly highlighting these blended learning components in the adapted scheme of work in Annex iii, trainers can effectively plan and implement technology-enhanced teaching strategies to ensure a balanced, competence-based learning experience for TVET students.

(2) Adaptation of the Session Plan for blended learning

A Session Plan is a detailed outline of the teaching activities, strategies, and resources used during a specific learning session. A session plan is more specific as it covers a shorter time frame such as one class or training session within a broader course. For Blended Learning in TVET, a Session Plan template is designed to guide the delivery of both online and face-to-face components during a particular session, ensuring a coherent and engaging learning experience that blends digital and in- person learning.

A session Plan in Blended Learning for TVET should be designed to:

- **Provides a clear session structure:** It ensures that both the online and in-person components of the session are well-organized, with a clear flow of activities that support the learning objectives.
- **Guides the Trainer:** It acts as a roadmap for the trainer, outlining how to deliver the content, engage students, and assess learning outcomes in both offline and online environments.
- **Promote Engagement:** It ensures that the session is interactive and engages students through a combination of digital tools, hands-on activities, and collaborative learning.
- **Aligns Activities with Learning Goals:** It ensures that activities (both online and offline) align with the learning objectives and contribute to skill-building in a way that mirrors real- world practices.
- **Facilitates Assessment and Reflection:** It includes formative and summative (both online and offline) assessment strategies that help monitor student progress during the session, as well as time for trainer reflection on the session's effectiveness.

Based on the review conducted on the current session plan for TSSs, it was realized that this template does not clarifies on:

- ***Indicative Content (hard or digital/soft)***
- ***Online and Offline activities for trainers and learners,***
- ***Online and in-class assessment and evaluation activities***
- ***Type of reflection space (virtual or offline)***
- ***Learner assessment tools (hard versus digital tools)***

For better guidance on how TVET trainers will use the session plan template, the adapted template, including clarification on areas to specify online and in-class considerations, is provided in ***Annex 2.***

7.1.4. Assessment and Evaluation for TVET Curricula and Manual Adaptation

In a blended learning environment for TSSs, conducting learner assessment and evaluation requires integrating both online and offline methods to effectively evaluate theoretical knowledge, practical skills, and workplace competencies. The following are key guides on how schools in Rwanda can assess learners in such a blended learning environment:

- The assessment should be a mixture of online for theory parts and face-to-face assessments for practical components.
- Trainers may use regular, low-stakes quizzes, polls, or reflections to gauge learner understanding.
- Other technology-mediated assessments like VR/AR/XR, simulations and video-based features may be used to assess the practical components.
- For the formative assessments that are administered online, trainers should provide immediate feedback to help learners improve their learning and preparation for summative assessments.
- Online assessment should follow and respect the normal assessment procedures and standards (moderation, consideration of Bloom's taxonomy, alignment with learning outcomes).

- Anti-plagiarism mechanisms (use of plagiarism checkers) and proctoring tools need to be used as mechanisms to authenticate assessment and evaluation processes.
- For performance-based assessment (practical hands-on), trainers should evaluate learners on real-world tasks, projects, and simulation-based activities.
- Where possible, trainers may use LMS rubrics to assess practical skills consistently
- Learners should be encouraged to create E-portfolios showcasing their work and skills, which will be documented in logbooks.
- Online assessments should be accessed by students with disabilities and different needs to foster inclusion and diversity
- Learners should be encouraged to peer assessment through reflections on their progress and providing constructive feedback to peers. This will help learners in developing learners' critical thinking
- To ensure diversity and inclusion, UDL guidelines should be used to design multiple assessment formats such as (text, video, oral, simulations...etc) with flexibility in deadlines for submission and methods for demonstrating acquired knowledge and skills.
- Accordingly, the design of assessment should enable learners with disabilities to use tools like screen readers, voice-to-text software, or specialized keyboards.
- Other technology-mediated assessments like VR/AR/XR, simulations and video-based features may be used to assess the practical components.
- For the formative assessments that are administered online, trainers should provide immediate feedback to help learners improve their learning and preparation for summative assessments.
- Online assessment should follow and respect the normal assessment procedures and standards (moderation, consideration of Bloom's taxonomy, alignment with learning outcomes).

(i) Assessment tools and strategies in blended learning

In blended learning environment of TVET curricula, both formative and summative assessments play crucial roles in tracking student progress and ensuring skill acquisition. Trainers should use the following assessment tools and strategies:

For formative assessments: These are continuous assessments that aim at improving student learning and providing feedback for an ongoing TVET course or unit.

- **Online Quizzes and Polls:** These tools provide automatic feedback to students especially when assessing theoretical knowledge
- **Rubrics:** For peer and self-assessment, trainers can design rubrics in Moodle where learners build reflective and critical thinking skills
- **Discussion Forums and Blogs:** These tools can be used to encourage learners' participation in online discussions or reflective blogging. Blogs help in assessing communication, collaboration, and understanding of lecture sessions
- **Digital Journals or ePortfolios:** With these tools, students document their progress, projects, or practical work and trainers provide ongoing feedback on skills development.
- **Simulation and Virtual Labs:** These tools allow students to practice technical tasks in virtual environments. Trainers, on their side, monitor task completion and problem-solving ability.

For summative assessments: These assessments evaluate learning at the end of a unit or course and they contribute to final grades or certifications after completing a curriculum.

- **Practical Skill Demonstrations:** In-person or recorded videos of students performing a particular task. TVET trainers may use standard rubrics to assess the practical competency after these recorded demos.
- **Project-Based Assessments:** These may include **capstone projects** that integrate multiple learner skills. These project reports can be submitted via Moodle and then be assessed and graded by trainers
- **Online/Offline Exams:** These include theory exams conducted on LMS platforms or on paper using a variety of question types such as multiple-choice, short-answer, or scenario-based questions.
- **Competency-Based Assessment:** For TVET students, this type of assessment is based on national occupational standards or industry benchmarks. Trainers will evaluate whether students can perform job-related tasks
- **Oral Presentations or Viva Voce:** Assess understanding, communication, and defence of practical work or projects

7.2. Guides on digital content development and selection

7.2.1. Development and compliance of digital content in TSSs

In this section, we propose some guides to develop school-based digital content. The developed digital content must align with the specific skills, knowledge, competencies, and outcomes defined by the TVET curriculum.

- For in-house development of the digital course content, subject matter experts (TVET trainers) should work collaboratively with instructional designers and multimedia experts in consultation with TVET quality assurance specialists
- Despite the adoption of a blended learning mode, TVET schools should emphasise digital content that stimulates practical, job-oriented learning tasks to prepare learners for the workforce.
- To follow the trade manual structure, the digital content should be developed in small, self-contained units that allow flexibility for teachers and students to access learning materials in parts. (E.g. Short videos, and audios for learner access)
- Course materials should be designed to work efficiently in low-bandwidth environments by for example compressing multimedia content in light formats (Videos in MP4, graphical images in JPEG, TIFF or PNG)
- Trainers should provide easy downloadable versions of content for offline use at school or at home
- The theoretical content should be developed interactively with H5P and SCORM Packages.
- Other resources can be uploaded in the form of presentations, PDF, eBooks, and subtitled video tutorials to ensure inclusivity and diversity of learners.
- Other resources can be uploaded in the form of presentations, PDF, eBooks, and subtitled video tutorials to ensure inclusivity and diversity of learners.
- Trainers should seek guidance on integrating immersive technologies (VR/AR/XR and AI tools) for continuously creating digital content as per the trades' needs.
- Where applicable, digital content should be created in multiple languages or translations for diverse learner groups to ensure inclusivity.
- Either theoretical or practical digital content from other sources should be selected following the Creative Commons (CC BY 4.0) guidelines (Creative Commons, 2024) and in consideration of different trades' needs.
- The quality assurance personnel should monitor the selection and development of digital content for Schools considering the trade-based needs of the market.
- RTB in collaboration with schools should increase the level of accessibility to all types of digital content.

7.2.2. Selection of digital content repositories and digital books (e-books)

A well-organized digital content repository for TVET schools can provide access to a wide range of materials, including video tutorials, interactive learning courses, textbooks, simulations, digital assessments, and more, in both theoretical and practical domains. Tools such as YouTube Education, Alison, VET Training, Turnitin and Moodle Database will be used to support trainers for selection digital content repositories relevant for their courses.

- YouTube Education
- Alison LMS
- VET Training Platform
- Turnitin
- E-library databases

- ***Selected YouTube education:*** This is a feature and collection of educational content available on YouTube, designed to help learners of all ages access a wide range of free, instructional videos on virtually any subject. YouTube videos often incorporate multimedia elements like visuals, animations, diagrams, and real-world examples, making complex concepts easier to understand, which is particularly helpful for technical fields.

- ***Online learning platform (e.g.: Alison):*** This kind of online learning platform can provide free courses, and certificates in a variety of TVET subjects. It provides courses that are available in different formats, including text-based lessons, audio-visual tutorials, and interactive assessments.
- ***VET Training Platform:*** This is another system designed to deliver, manage, and support vocational education and training programs. Particularly useful in providing industry-specific skills and practical knowledge to learners who are preparing for careers in fields like, architecture, engineering, construction, IT, design, manufacturing, and more. It may also serve as an LMS that helps TVET trainers to organize, track, and manage their courses, which could be structured through modules, workshops, tutorials, and assessments.
- ***Turnitin:*** This text-matching tool and plagiarism detector will support TVET schools to improve the quality of learning and promote academic integrity in a blended learning environment. This tool is empowered with an AI writing detection solution which will support TVET trainers and students to ensure academic integrity in their work.

- ***Several E-library databases:*** These databases provide access to textbooks, research papers, manuals, technical guides, and multimedia content that support both theoretical learning and practical skills development. Trough subscriptions by TSSs, trainers will have access to E-books and other electronic resources that can be integrated in their courses. The following are good examples of E-library databases that trainers may use in their courses:

1. **IEEE Xplore Digital Library:** (For Engineering, Technology and Applied Sciences)
2. **Vocational Education and Training (VET) Library:** Providing resources for vocational training and skills development
3. **Open Educational Resources (OER) Commons:** For free, open-access resources for TVET education
4. ScienceDirect (Elsevier): for Engineering, technology, and applied sciences
5. **SpringerLink:** (For science, Engineering and other technical fields)
6. **Taylor & Francis Online:** (For applied research and industry standards)

7.2.3. Adoption of open education resources by trainers

For TSSs with limited funding, trainers should leverage Open Educational Resources (OERs) for existing free and Creative Commons-licensed content.

Accordingly, TVET trainers should search and identify TVET-related OER platforms and repositories where they can reuse some resources for teaching and learning. Some of the known TVET-specific platforms include for example:

- **SkillsCommons**
- **UNESCO's TVET OER repository,**
- **PhET Interactive Simulations,**
- **MIT OpenCourseWare.**

Verified and licensed OER resources by Creative Commons should be customised and aligned with the Rwandan TVET Curriculum and TVET standards before being used by TSSs in Rwanda. The following figure shows how trainers should integrate OERs in a blended learning environment for TVET schools:

Figure 11. Integrating OER in Blended Learning for Technical Secondary Schools

7.2.4. Consideration on copyright of digital content

With TSSs shifting from a traditional to a blended learning environment, this will involve significant changes, especially regarding the use of digital content. Copyright can be challenging for trainers and TSS students because of the wide range of digital resources such as videos, articles, images, software, and more that trainers may want to incorporate into their courses.
For TSSs to cater for copyright in a blended learning environment the following aspects will be important:

i. Trainers understanding Copyright Laws

TVET Trainers should ensure they have a solid understanding of copyright laws that apply to educational content. The shift to blended learning model will go in parallel with trainings and awareness on copyright issues and management for the digital content to be created and availed online.

Trainings and awareness campaigns will for example involve the following:

- ***What is copyrighted:*** Trainers should be aware that any original work (e.g., text, audios, images, videos, or software) is automatically protected by copyright once it is created.
- ***Fair use and fair dealing:*** Trainers should know that the fair dealing approach allows the limited use of copyrighted material for educational purposes without needing to obtain permission.

ii. Digital content licensing and permissions

- TSSs should secure the appropriate licenses or permissions for digital content to be used by trainers across all trades. These include for example the open education resources (OERs) that can be legally used, modified, and shared.
- TSSs should also opt for purchasing subscription Services to platforms that provide access to licensed educational content (e.g., databases, journals, e-books). These platforms often offer permission to use content within educational settings.

iii. Attribution and acknowledging sources

When using digital materials, TSSs trainers will have to be trained on how to properly attribute the sources, especially if the content is under a Creative Commons license or if it is used under fair use. from an online platform, link back to the original website or platform as a way of giving credit.

- ***Cite authors, creators, or sources:*** Always provide full citations for any content used that is not originally created by the trainer or school.
- ***Provide links to original sources:*** If content is used from an online platform, link back to the original website or platform as a way of giving credit.

iv. Trainers' creation of original content

Trainers will also be trained on how to mitigate copyright issues by creating their own educational materials. When creating videos, lesson plans, or other resources, educators can retain ownership of the content and ensure it is freely available to students.

v. Educate students on copyright

TVET students should be trained on the principles of copyright and intellectual property. In a blended learning environment, students might be more inclined to download and share digital content without proper understanding. Hence, this could inadvertently violate copyright. To avoid this, TSSs should:

- Offer training sessions on copyright and fair use to TVET students.
- Provide contextual and easy-to- use guidelines on how to create and share content responsibly.

vi. Addressing copyright with digital tools

There are several digital tools that can help control and manage copyright and plagiarism. Digital Rights Management (DRM) tools such as ***Google Widevine, Adobe Digital Editions, Microsoft PlayReady and LockLizard*** may be used to restrict the distribution.

These tools also support trainers to use digital content by ensuring that it stays within the intended context (e.g., within LMS of the TSSs). Additionally, plagiarism Checkers Tools like Turnitin can help monitor student submissions for proper citation and avoid unintentional copyright infringement.

"Copyright is critical in blended learning environment and it must be monitored by TVET trainers"

7.2.5. Promoting Student-centred Learning in TSSs by trainers

Student-centered learning emphasizes the active role of students in their own learning process, fostering autonomy, critical thinking, and problem-solving skills. In the context of blended learning for TVET context, where there is a combination of online and face-to-face learning, the student- centered approach aligns perfectly to meet the diverse needs of learners. Trainers that adopt blended learning will need to coach students and help them to adapt to this new learning environment by promoting the following in their courses:

- **Establish personalized learning paths (PLP):** by allowing students to progress at their own pace, offering self-directed learning opportunities (both in-class and online) through adaptable digital interactive content and formats

- **Promote active learning (AL):** Trainers should incorporate learning activities that enable students to actively engage with the course materials, such as *case studies, problem-solving, case, active role-playing, and hands-on projects.* Active learning can be designed to take place both in- class and online through self-directed demonstrations, lab and workshop experiments

- **Learner choice and autonomy:** Trainers should providing options for students to choose how they learn or demonstrate learned skills, knowledge and competencies. Also, this allows students to choose between different project formats, and collaboration channels or work independently or in small groups, while at labs, workshops or apprenticeship places.

- **Peer-to-peer learning:** Prepare and design learning activities that enable self-regulated peer-to-peer learning at their convenience. TVET Schools should also encourage teamwork and peer learning through group projects, collaborative discussions, or problem-solving tasks. TVET students can benefit from sharing their experiences and knowledge, especially in practical, hands-on-related courses.

"Appropriate support to TVET students is key for effective blended learning implementation"

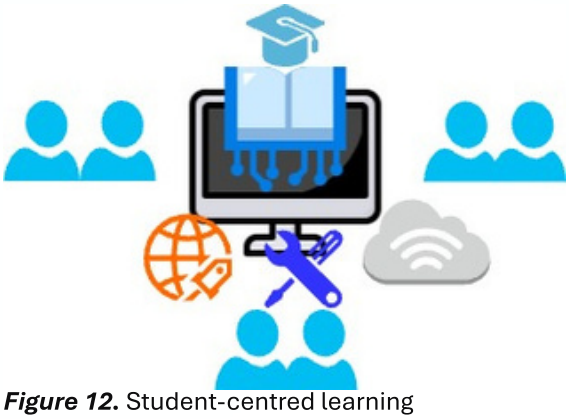


Figure 12. Student-centred learning

7.2.6. Student timely and appropriate support

For students in TSSs to be able to adapt in a blended learning environment, appropriate technical support should be available. These include for example:

- **Students E-championship**: TSSs in collaboration with partners and trainers' community of practice should establish Training of Trainers (ToT) programs on digital literacy skills for senior TSS students.

- **Online and face-to-face Support:** TVET students should be provided with easy access to both technical support on using LMSs and other digital tools for learning purposes. This can include E-tutoring, mentorship, and peer support on EdTech tools. In-person assistance for technical issues on students' digital devices, computer labs and workshop premises.

- **Students' check-in hours/timetable with instructors:** A clear check-in consultation should be created and shared to TVET students.

- **Detailed contact information & channels:** Students should have access to instructors, technical support staff, and tutors' contact details to be used when support is needed. Different types of communication channels, such as email, messaging apps, and video conferencing tools such as MS Teams, Google Meet, phone numbers and emails should be made available on LMSs and school premises for easy communication.

7.3. Quality Assurance Framework and Metrics for Blended Learning Courses

Blended learning courses developed and implemented in TSSs for all the trades will be continuously undergoing a quality assessment to ensure the learning outcomes are not affected by integrating online learning facets. The blended learning quality assurance framework with indicators and metrics for blended learning courses in TSSs has been proposed in Annex ii. This framework can also be used for quality assurance of their specific courses. The framework also describes the types of data, the process for data collection and analysis, and the frequency for collecting the data related to blended learning implementation in TSSs. The core categories of quality assurance in blended learning and related key performance indicators (KPIs) that will be used to assess the implementation of blended learning in TSSs are presented in figure 6 below.

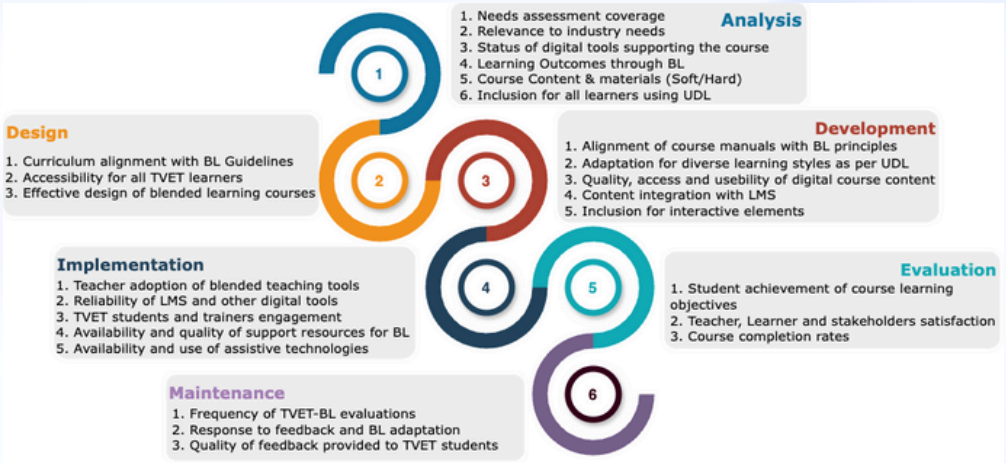


Figure 13. Quality Assurance Framework for Blended Learning Courses in TSSs

"It is always important for TSS trainers to evaluate their BL courses for quality assurance, further improvement and alignment with trade-related industry "

As observed in figure 6 above, the proposed framework for quality assurance of blended learning courses will follow a six-step process starting from ***analysis, design, development, implementation, evaluation and maintenance*** of the blended learning courses.

- At the analysis level, the quality assurance assess the relevance of the TVET course to the industry needs and the digital tools that has supported the course delivery.
- At the design level, metrics are used to assess how the curricula aligns with the blended learning guidelines and the level of accessibility and inclusion for all learners
- As the development level, the quality of the TVET course will be measured through the alignment with BL principles as well as the quality of digital content in terms of access, usability and inclusivity.
- At the implementation level, the quality assurance of TVET courses should be assessed based on the level of students and trainers engagement with the digital contents. The course quality will also be viewed on the content integration in LMS and the reliability of the LMS and other adopted digital tools
- At the evaluation level, the quality of BL course will be assessed based on the students achievement and performance in summative and formative assessments and the stakeholders satisfaction. Additionally, the quality of the BL course will also be assessed by considering the student completion rates.

The measurement metrics, source of data and the proposed data analysis approaches are also proposed in ***Annex ii***. Trainers in collaboration with the school administrators can work together to evaluate the status of their courses using this framework. The framework can also serve as a reference when trainers aspire to assess how their courses are designed and implemented.

8. Trainer's professional development and continuous learning

8.1. Developing your digital literacy and online pedagogical skills

One of the most important prerequisites for a successful adoption of blended learning into the curriculum is the digital competencies of teachers, mentors, and students. These include not only the technical skills that teachers need to use the appropriate technology but also an understanding of E-pedagogy and the implications of redesigning a blended learning course.

Digital skills are crucial for TVET trainers in TSS as they encompass the ability to use technology effectively in teaching, learning, assessment and engagement with students. As a trainer, you need to develop the following technical skills (*See figure 14*) to use digital tools and platforms for effective implementation of blended learning. As a TVET trainer, you should attend trainings for these specific skills development for better integration of blended learning in your course.

Based on the assessment conducted at the pilot TSSs across Rwanda, not all trainers are at the same level for these digital skills. Hence, before attending any training on each of these digital skills, a pre-assessment of the training needs should be carried out to map different levels of trainers on each type of digital skill.

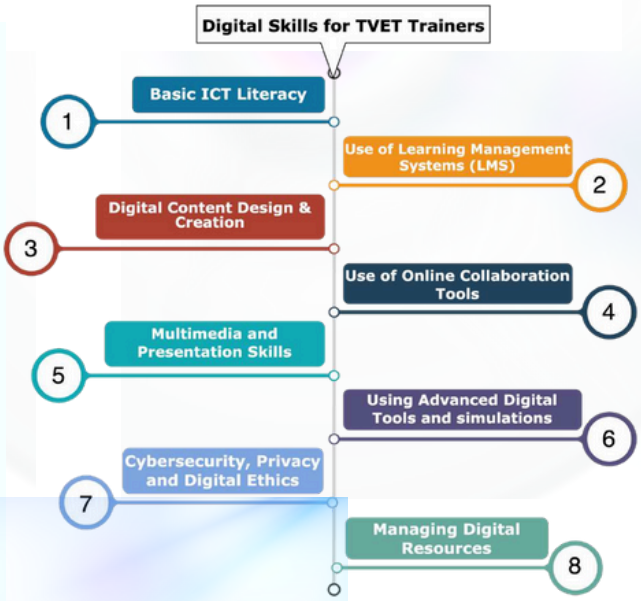


Figure 14. Proposed Digital Skills for Trainers

Figure 15. Proposed E-pedagogy skills for Trainers

Trainers need also to be equipped with E-pedagogy skills to enable them design quality online courses, use interactive platforms, multimedia tools, assistive technologies, and online resources and improve their teaching in blended learning environment. Having E-pedagogy skills helps in making lessons more engaging and accessible for diverse learners. This helps cater to different learning styles and enhances students' understanding of practical hands-on subjects as well as theoretical understanding of their trade-based subjects.

When TSS trainers are well equippedwith modern pedagogy, this encourages the use of online communication tools, which help trainers and students stay connected and engaged in content. Overall, equipping trainers with E-pedagogy skills supports the integration of blended learning in TVET education. A summary of the proposed E-pedagogy skills for effectively blending teaching, learning and assessment using digital tools and EdTech solutions are presented in Figure 15.

8.2. Communities of Practice and Peer Learning

With the support from TSSs, trainers are strongly encouraged to form Communities of Practices (CoPs) which offer collaborative, professional, and practice-based support. Through CoPs, trainers will:

- Share best practices in using digital technologies and pedagogical strategies.
- collaborate on creating and updating course content to reflect real-world practices.
- Receive mentorship from seasoned trainers and increase confidence in using blended models effectively.
- Foster a culture of continuous improvement and innovation in blended teaching methods for TVET courses

Digital tools that may be used by CoPs in TSSs include:

- Online teacher forums within national TVET platforms such as RTB E-learning platform.
- WhatsApp or Telegram groups for specific trades
- In-person cross-school communities where instructors across regions collaborate on implementing e-learning in practical courses.

9. Conclusion

This version of the guidelines is proposed for Trainers in Technical Secondary Schools in Rwanda. It is an abridged version of the entire guidelines for blended learning implementation in TSSs. Accordingly, the proposed blended learning guidelines for TSS trainers are developed considering the alignment with the context of the Rwandan TVET sector. The proposed guidelines provide a summarised step-by-step on how trainers in TSSs can shift from traditional face-to-face to a blended teaching and assessment environment considering the Rwandan TVET context.

In this first version of the Blended Learning guidelines for trainers of TSSs in Rwanda, an adaptable blended learning model has been proposed to serve as a core guide to TVET trainers to design and develop their courses in both face-to-face and online environments. The proposed model encourages TVET trainers to consider offline and online teaching, learning and assessment.

Hence, the proposed adaptable blended learning model can serve as a reference for TSS trainers when a specific school implements a blended learning approach. Hence, the proposed blended learning model (See figure 3) provides possibilities for flipping and rotating in classrooms, workshops, workplaces, labs and in an online learning environment for teaching, learning and assessment activities at each TSSs. Trainers from all trades of TSSs in Rwanda can use the proposed abridged version of the proposed guidelines.

In addition, this version of the BL guidelines highlights also how aspects of diversity and inclusion for both disability and gender can be taken into consideration when designing and delivering TVET courses in a blended learning environment. Guides on how trainers can develop, select and use digital content are also provided. These guides extend further to accentuate how trainers will avoid copyright issues in the digital content used in their courses, all being done in collaboration with their schools.

Accordingly, the provided abridged guidelines for trainers propose also new elements that have been incorporated in the course manual, the scheme of work and the lesson plan templates to embrace blended learning in TVET courses. Afterwards, these guidelines provide an indication of how trainers will promote student-centered learning in a blended learning environment.

"TVET trainers play a critical role in designing and delivering skill-based content, integrating technology, mentoring learners, and leading innovation to ensure the effective adoption of blended learning in TVET schools."

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"TVET schools need to integrate blended learning to better serve today's digital learners, enhance flexible and practical skills delivery, and respond to the growing market demand for a tech-savvy and adaptable workforce."

Appendices

Annex 1. Adapted CBTA-Scheme of Work with BL Consideration

Annex 2. Adapted CBT-CBA-QA Session Plan with Blended Learning

Annex 3. Adapted TVET-CBC-Module Content Template with BL Aspects

Blended Learning Guidelines for TSSs. A TVET Trainer's Guide

RTB | RWANDA TVET BOARD

CBT/CBA/QA Implementation

ADAPTED TOOLS (Templates) FOR BLENDED LEARNING

2025

SCHEME OF WORK CHECKLIST

No	Criteria	Indicator	(Yes/No)	Comments
1.	School details	Logo is mentioned		
		School name is indicated		
		School address is indicated		
2.	Qualification Information	Sector is indicated		
		Sub-sector is indicated		
		Level is indicated		
		Qualification title is indicated		
3.	Module details	The code and title of the module is indicated		
		Learning outcomes (LOs) are clearly stated and aligned with blended tasks.		
		Number of classes are indicated		
		Total learning hours (split into online/offline) are indicated.		
4.	Delivery timeline	The weeks the module will be delivered are indicated		
		Duration of each learning outcome is mentioned and Synchronous (live) vs. asynchronous (self-paced) activities are planned.		
5.	Indicative contents	Learning activities are indicated		
		Learning resources are indicated		
		Learning place distinguishes online vs. in-person venues.		
		Digital and physical resources (e.g., LMS, tools, software) are listed.		

6.	Assessment	Formative assessment evidences (e.g., online quizzes, polls, peer reviews) are detailed.		
		Summative assessment for specific modules(Task, consumables, assessment place) is planned		
7.	Observation	Observation place for each indicative content is provided		

Checked by:

Signature:

Date:……/……/……..

School details (Logo, Name, adress)

NYANZA TECHNICAL SECONDARY SCHOOL
Building the future

SCHEME OF WORK

Sector:		**Trainer:**	
Trade:		**School Year:**	
Qualification Title:		**Term:**	
RQF Level:		**Module details**	
		Module code and title	
		Learning hours:	
		Number of Classes:	
Date:		**Class Name:**	

Term: 1

Weeks	**Competence code and name**			**Learning Activities**	**Resources (Equipment, tools, and materials)**	**Evidences of formative assessment**	**Learning Place**	**Observation**
	Learning outcome (LO)	**Duration**	**Indicative content (IC)**					
1	LO1:		IC1.1:	Mix of synchronous (live sessions) and asynchronous (self-paced) tasks. For asynchronous: Pre-recorded lectures, virtual simulations, discussion forums, self-paced quizzes.	This include the Digital tools such as LMS (e.g., Moodle), Zoom, Google Classroom, Padlet, Kahoot, virtual labs,	For asynchronous: Pre-recorded lectures, virtual simulations, discussion forums, self-paced quizzes.	This include the Digital tools such as LMS (e.g., Moodle), Zoom, Google Classroom, Padlet, Kahoot, virtual labs, Simulation software (e.g., Cisco Packet Tracer).	

				Face-to-face: Hands-on lab tasks, group discussions, Practical demonstrations	Simulation software (e.g., Cisco Packet Tracer). Physical materials for face-to-face such as computers, projectors that are needed to achieve the learning outcome.	Face-to-face: Hands-on lab tasks, group discussions, Practical demonstrations	Physical materials for face-to-face such as computers, projectors that are needed to achieve the learning outcome.	
			IC1.2:					
			IC1.3:					
2	LO2:		IC2.1:					
			IC2.2:					
			IC2.3:					
3	LOn:		ICn.1:					
4	Integrated Assessment (for specific module)			Hybrid projects (e.g., e-portfolios + practical demonstrations and simulations for TSSs with such technologies)	-E-portfolio tools like google sites -Simulations like cisco packet tracer, etc -Computers -Internet -Projector -Recording tools		In blended mode: |Workshop Online Classroom	

			like flipgrid -Online Collaborative tools			

Trainer's name and signature:

Term: 2

Weeks	Competence code and name			Learning Activities	Equipment, tools, resources (ETR)	Evidences of formative assessment	Learning Place	Observation
	Learning outcome (LO)	Duration	Indicative content (IC)					
1	LO1:		IC1.1:					
			IC1.2:					
			IC1.3:					
2	LO2:		IC2.1:					
			IC2.2:					
			IC2.3:					
3	LOn:		ICn.1:					
4	Integrated Assessment (for specific module)			Task	Consumables		workshop	

Trainer's name and signature:

Term: 3

Weeks	Competence code and name			Learning Activities	Equipment, tools, resources (ETR)	Evidences of formative assessment	Learning Place	Observation
	Learning outcome (LO)	Duration	Indicative content (IC)					
1	LO1:		IC1.1:					
			IC1.2:					
			IC1.3:					
2	LO2:		IC2.1:					
			IC2.2:					
			IC2.3:					
3	LO3:		IC3.1:					
4	Integrated Assessment (for specific module)			Task	Consumables		workshop	

Prepared by: ***(Name, position and Signature)***

Verified by: ***(Name, position and Signature)***

Approved by: ***(Name, position and Signature***

CBT/CBA/QA Implementation

ADAPTED TOOLS (Templates) FOR BLENDED LEARNING

2025

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SESSION PLAN QUALITY CHECKLIST

No	Criteria	Indicator	(Yes/No)	Comments
1.	School information	School logo is indicated		
		school name is mentioned		
		school address is indicated		
2.	Module specification	The code and name of the module are mentioned		
		Sector, trade, and level are mentioned		
		Learning outcome is indicated		
		Indicative content is indicated		
3.	Details of the Session	Topic of the session is identified		
		Range is defined		
		At least 3 SMART objectives are formulated		
		Activities are timed and specify mode (online/in-person).		
		Identified resources include digital tools (e.g., LMS, virtual labs) and physical materials are relevant		
		Facilitation techniques include blended strategies		
4.	Introduction of the Session	Trainer's activities are defined and include setting up online tools (e.g., LMS, polls).		
		Learner's activities are defined and include accessing pre-session materials (e.g., videos, demos, readings).		
5.	Development of the Session	Trainer's activities are defined and include live demonstrations + asynchronous support (e.g., forum moderation).		
		Learner's activities are defined and include offline and online tasks (e.g. supervised virtual collaborative tasks, engage with simulation content)		
6.	Session Conclusion	Summary activities are planned and include online tools (e.g., quizzes, e-portfolios) and/or in-person tasks.		
		Assessment is Planned (e.g., online quiz, CAT, Lab Projects,)		
		Session evaluation activities are planned (E.g. Google Form, Polls, Online Evaluation Form)		
7.	References	Text Book; APA referencing is respected and ind include digital sources that are OER.		
		Web page; APA referencing is respected		
		At least three (3) references are given (Including E-resources)		
8	Appendices	Relevant Handouts are attached (Including hard and soft copies uploaded on LMS)		
		Relevant Task sheets are attached		
		Relevant Assessments tools are attached		

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9	Reflection	Reflection reporting space is provided		

Checked by:

Signature:

Date: ……/……/……..

School Logo and School information

SESSION PLAN

Sector :	**Trade :**	**Level :**	**Date :**
Trainer name :			**School year:** **Term :**
Module (Code&Name):	**Week :**	**No. Trainees:**	**Class(es):**
Learning Outcome	Align with blended activities, e.g., Apply [skill] using virtual simulations and in-person practice.		
Indicative content			
Topic of the session:			
Range:	**Duration of the session:**		
Objectives: Example: Learners will submit a virtual lab report through the LMS.			
Facilitation technique(s): Blended learning techniques such as Synchronous, flipped classroom, etc should be clearly defined			

Introduction	**Resources**	**Duration**
Trainer's activity: Must indicate trainers' activities that can include blended learning activities. Example: Share pre-session video via LMS. **Learner's activity:** Should include blended learning activities based on the nature of the course. Example: Watch pre-session video and post questions on the forum.	Include digital tools such as LMS	
Development/Body		
Step 1:	**LMS, Collaborative Tools such as MS Teams, Webex, Google Meet, E-**	

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Trainer's activity: Organise Virtual Group Works, Live Demos **Learner's activity: Engage in interactive contents such as SCORM or H5P contents, Peer-to-peer discussions via LMS..etc** **Step n:** **Trainer's activity:** **Learner's activity:**	**Portfolios, Computer Labs, Simulations, etc.**	
Conclusion		
Summary:		
Assessment/Assignment	Include assessment to be conducted and done by students using digital tools such as quizzes, forums, live demos, virtual presentations etc…	
Evaluation of the session:		
References:		
Appendices:		
Reflection:		

Session delivery self-reflection guide

No	Criteria	Indicator	Yes/No/Not Applicable (NA)	Comment
1	Achievement of objectives	Objectives related to Cognitive domain (Knowledge) are achieved		
		Objectives related to Psychomotor domain (Skills) are achieved		
		Objectives related to Affective domain (Attitudes) are achieved		
2	Resources	Vocational materials are effectively used		
		Teaching aids are effectively used Digital teaching aids (e.g., interactive videos, virtual whiteboards) enhanced learning.		
3	Learning activities	Used online facilitation techniques are adapted to the topic and suited for blended learning		

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		Learners engaged equally online and in-person (e.g., forum posts, hands-on participation).		
4	Learners understanding	Opportunities for learners to ask questions during the session and across platforms are provided.		
		Learners' questions are effectively handled		
		Opportunities for formative assessment are provided and immediate feedback (e.g., auto-graded quizzes, peer reviews) was provided		
		Opportunities for receiving learners' feedback is provided		
		UDL principles were applied (e.g., materials in text, audio, video formats).		

SESSION DELIVERY MONITORING CHECKLIST

Trainer's name: **Date:** **Period:**
Sector: **Trade:** **Level:** **Class:**
Number of trainees:
Module (Code &Name) conducted during class observation:
Learning Outcome:
Indicative Content:
Topic of the Session:

Criteria	Indicator/observation	0 (Not available)	1 (very poor)	2 (poor)	3 (Good)	4 (Very good)	5 (Excellent)	Observation
Pedagogical documents	Scheme of work is respected							
	Session plan integrates digital tools (e.g., LMS, virtual labs) and is followed.							
	Class diary is available and it include blended learning activities and up to date.							
	Class attendance list is effectively used							
	Trainer masters the subject by providing clear explanation,							

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Session delivery	typical and relevant examples where needed							
	Facilitation techniques (Variation; Relevance; Quality of handling questions) including blended learning activities like (e.g., breakout rooms, polls). is applied							
	Teaching aids blend digital (e.g., simulations, videos) and physical resources are used (Variation; Relevance; Quality; Effectiveness)							
	Didactic materials are available of offline/online used (Variation; Relevance; Quality; Effectiveness)							
	Trainer's self-presentation (Proper work attire, appropriate use of language, appropriate use of body language)							
	Class is well managed (Handling interruptions;)							
	Didactic materials are accessible online/offline (e.g., captioned videos, e-books).							
	Learning environment is conducive (Organization; Safety precautions, Cleanliness of the learning place)							
Sub/Total								/
Average(sum of all rate/number of indicators)								
Strength:								
Area of improvement:								
General Observation: ***Excellent:*** ☐ ***Very good:*** ☐ ***Good:*** ☐ ***Poor:*** ☐ ***Very poor:*** ☐								

Teacher's *comments:*

……
……

TVET Teacher's names & signature:

Evaluated by:

Name, Position & Signature

Date: ……/……/…….

Date: ……/……/…….

Module Content template

Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

Module Code

Module Tittle:……

Competence Tittle:……

Competence

RQF Level: ……

Learning Hours: ……

Credits: ……

Sector: ……..

Trade: ……

Module Type: Specific/General/Complementary

Curriculum: ……..

Issue Date: MM/YYY

Module structure

Purpose statement	…… ……				
Delivery modality	Training delivery		100%	Assessment	Total 100%
	Theoretical content		30%	Formative assessment 30%	50%
	Practical work:		70%	70%	
	Group project and presentation	….%			
	Individual project /Work	….%			
				Summative Assessment	50%

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria

Course content

Learning outcomes	At the end of the module the learner will be able to: Examples: ● Describe basic measurements in physics using online simulations and virtual labs, and demonstrate these concepts in face-to-face lab sessions. ● Edit photos using Adobe Photoshop through online tutorials and apply these skills in face-to-face design workshops. ● Export files in various formats using online guides and demonstrate this process during practical lab sessions. ● Manipulate data with JavaScript using online coding platforms and apply these skills in face-to-face coding workshops. .... …
Learning outcome 1: …	Learning hours: …
Indicative content	
Based on performance criteria and the extend at which learning outcome is. *(What, Up to, and How):*	
Resources required for the learning outcome	
Equipment	● Laptops/Computers ● Projectors ● Interactive whiteboards ● Printers ● Workshop tools (e.g., soldering kits, design tools) ● Assistive devices (e.g., screen readers, Braille displays)
Materials	● Online course modules ● Video lectures ● Interactive content created with H5P ● Interactive quizzes ● E-books and PDFs ● SCORM packages ● Captioned videos ● Printed handouts ● Lab manuals

	• Physical prototypes • Workshop materials (e.g., wires, circuits, fabrics) • Accessible course materials (e.g., large print, Braille) • Simplified instructions
Tools	• RTB Learning Management System (LMS) • Video conferencing tools (e.g., Zoom, MS Teams) • Interactive platforms (e.g., H5P, Kahoot) • Coding platforms (e.g., CodePen, JSFiddle) • Virtual labs (e.g., Labster, PhET Simulations) • Design software (e.g., Adobe Photoshop, Illustrator) • Coding software (e.g., Visual Studio Code, GitHub) • Simulation tools (e.g., AutoCAD, SolidWorks) • Presentation tools (e.g., PowerPoint, Prezi) • Accessibility tools (e.g., text-to-speech software, speech-to-text tools) • Captioning tools (e.g., YouTube captions)
Facilitation techniques	• Self-directed study: Students will learn on their own offline and online on RTB e-learning platform. • Online facilitation: Students will be facilitated in learning activities on the RTB e-learning platform by doing quizzes, and responding to discussion forums. • Use live virtual classes (e.g., Zoom, Teams) for real-time discussions, Q&A, and collaborative activities.
Formative assessment methods /(CAT)	• The formative assessment will include online quizzes (auto-graded), peer feedback in forums,polls during live sessions, draft project submissions, peer reviews either online or in person.

Learning outcome 2: …	Learning hours: ….
Indicative content	
Based on performance criteria and the extend at which learning outcome is. *(What, Up to, and How):*	
Resources required for the indicative content	
Equipment	
Materials	

Tools	
Facilitation techniques	
Formative assessment methods /(CAT)	

Learning outcome N:….	Learning hours: ….
Indicative content	
Based on performance criteria and the extend at which learning outcome is. *(What, Up to, and How):*	
Resources required for the indicative content	
Equipment	
Materials	
Tools	
Facilitation techniques	
Formative assessment methods /(CAT)	

Tools	
Equipment	
Materials/ Consumables	

Integrated/Summative assessment (For specific module)

Integrated situation

Text for integrated situation:

For integrated situations, hybrid projects (e.g., e-portfolio + practical demonstration) as well using simulations will be done. ……..

……..

……..

Resource

- E-portfolio tools like google sites
- Simulations like cisco packet tracer, etc
- Computers
- Internet
- Projector
- Recording tools like flipgrid
- Online Collaborative tools such as Google Package (Word, Excel, PPT, Forms, ..etc)

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: (30%)		Ind.1			
		Ind.2			
		Ind.3			
		Ind.1			
		Ind.2			
		Ind.3			
Learning outcome 2: (40%)	2.1.	Ind.1			
		Ind.2			
		Ind.3			
	2.2.	Ind.1			
		Ind.2			
		Ind.3			
Learning outcome 3: (30%)	3.1.	Ind.1			
		Ind.2			
		Ind.3			
	3.2.	Ind.1			
		Ind.2			
		Ind.3			
Total marks					100
Percentage Weightage					100%
Minimum Passing line % (Aggregate): 70%					

References:

APA Format

Glossary

Term 1: meaning/definition in this curriculum

Term 2: meaning/definition in this curriculum

Term 3: meaning/definition in this curriculum

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Term n: meaning/definition in this curriculum

Author's Note Page

Authoring institution

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