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Quality Assurance

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DIGIBIOVET

Deliverable: Task 2.1 – Desk and field research on digital Competencies and Tools Essential for Enhancing Capacities Among TVET Trainers

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Executive Summary

This report presents the results of a twofold research and development effort carried out in the framework of the Erasmus+ *Digital Ecosystems in Biodiversity Enhancing Vocational Education and Quality Assurance (DIGIBIOVET)* project, aimed at strengthening digital transformation in Vocational Education and Training (VET). The study combines:

(A) field research on digital competences of TVET trainers in Sub-Saharan Africa (SSA) partner organizations, and

(B) the development of a digital repository of Open Educational Resources (OER) and best practices in VET across Europe and Sub-Saharan Africa (SSA) countries.

A. Field Research on Digital Competencies and Tools for TVET Trainers

The field research aimed to assess the self-perceived digital competences of TVET trainers and practitioners from partner organizations across five SSA countries: Ethiopia, Madagascar, Malawi, Mozambique, and Nigeria. A total of 35 trainers participated in the study, providing insights into current practices, strengths, and capacity gaps in digitally enhanced teaching and learning.

The full set of questionnaire items used in this research can be found in *Annex I*, which presents all questions addressed to TVET trainers.

Participating organizations include:

- Ethiopia: Wolaita Sodo University
- Madagascar: University of Antsiranana
- Malawi: Youth and Community Development Organization (YouthCode)
- Mozambique: Asejana
- Nigeria: Obafemi Awolowo University

The study adopted a SELFIE-inspired survey methodology, grounded in the European DigCompEdu framework, which conceptualizes educators' digital competence across six domains:



- Professional Engagement
- Digital Resources
- Teaching and Learning
- Digital Assessment
- Empowering Learners
- Facilitating Learners' Digital Competence

Using a 7-point developmental Likert scale, results were analyzed through descriptive statistics and mapped against DigCompEdu proficiency levels (A1–C2).

Key Findings

- There is a clear gradient across the five countries. Ethiopia shows the lowest overall digital competence profile, mostly at B1 – Integrator, with Digital Assessment even lower at A2 – Explorer. Malawi and Mozambique sit in the middle, showing a more mixed but improving profile, with some areas already reaching B2 – Expert. Nigeria and Madagascar perform the strongest overall, with most areas at C1 – Leader, indicating a much more advanced level of digital pedagogical competence
- Professional Engagement and Digital Resources domains tend to be among the strongest areas in most countries. This suggests that teachers generally adopt digital tools first for professional communication, preparation, and access to materials.
- There is a strong variation in the maturity of digital teaching and learning practices, but a common progression pattern is evident—from emerging integration (Ethiopia, Malawi), to functional use (Mozambique), and up to advanced, well-embedded digital pedagogy (Madagascar, Nigeria).
- Facilitating learners' digital competence tends to be one of the weaker dimensions across nearly all countries, even among high performers like Nigeria and Madagascar. This may mean that teachers are more confident in using digital tools for their own work than in helping students become digitally competent themselves.
- Digital Assessment. It is the weakest area in Ethiopia, but one of the strongest in Nigeria and Madagascar, and also relatively strong in Mozambique. This makes digital assessment a key differentiator between lower- and higher-performing systems.



B. Digital Repository of Open Educational Resources and Best Practices in VET

The second component of the report focuses on the development of a digital repository of Open Educational Resources (OER) and best practices, designed to support innovation and knowledge sharing in VET.

The repository aims to function as a structured, accessible, and user-oriented platform, bringing together fifteen (15) high-quality digital learning materials and proven pedagogical approaches from Bulgaria, Greece, Italy, Spain and the five SSA countries: Ethiopia, Madagascar, Malawi, Mozambique, Nigeria:

This initiative is grounded in the principles of Open Educational Resources, as defined by UNESCO, promoting free access, reuse, and adaptability of educational content to diverse local contexts. In doing so, it supports more inclusive and equitable learning opportunities, particularly in environments where access to quality educational resources may be limited.

Beyond providing open resources, the repository integrates a curated collection of best practices. These practices reflect proven and transferable approaches to the use of digital technologies in VET, demonstrating how innovation can enhance teaching, strengthen learner engagement, and improve skills development.

Overall, the repository serves as a dynamic tool that not only facilitates access to high-quality digital content, but also promotes continuous improvement in teaching and learning. By bridging the gap between theory and practice, it enables educators and institutions to adopt, adapt, and implement effective digital strategies, while encouraging cross-country collaboration and the ongoing evolution of training materials.

Together, the two components of this report provide a comprehensive response to the digital transformation needs of VET systems. The field research identifies current competence levels and critical gaps among trainers, while the repository offers access to high-quality digital content encouraging collaboration and knowledge sharing across institutions and countries.

By combining evidence-based analysis with accessible digital resources, the DigibioVET project contributes to building more inclusive, innovative, and future-ready VET ecosystems, both in Sub-Saharan Africa and Europe.



A. Field research on digital Competencies and Essential for Enhancing Capacities Among TVET Trainers

Tools

1.Introduction

Digital transformation is profoundly reshaping Vocational Education and Training (VET) systems worldwide. As digital technologies increasingly permeate teaching, learning, assessment, and institutional management processes, trainers are required not only to possess basic operational digital skills but also to integrate technology in pedagogically meaningful, ethical, and inclusive ways. In Sub-Saharan Africa (SSA), these expectations are further shaped by contextual realities such as uneven access to infrastructure and connectivity, institutional resource constraints, and differing levels of digital maturity among TVET providers.

Against this backdrop, Task 2.1 – Desk and Field Research on Digital Competencies and Tools Essential for Enhancing Capacities among TVET Trainers in the framework of the Erasmus+ Project: *Digital Ecosystems in Biodiversity Enhancing Vocational Education and Quality Assurance (DIGIBIOVET)* was undertaken to generate a reliable evidence based on the current state of trainers' digital competences within participating countries. The field research specifically targeted VET trainers and practitioners from partner organizations in Ethiopia, Madagascar, Malawi, Mozambique, and Nigeria, providing a grounded and comparative understanding of existing capacities, needs, and gaps in digital skills development within the vocational education sector.

The primary objective of the study was to capture SSA trainers' self-perceived digital competence levels, identify areas where capacity development is most urgently required, and provide actionable insights to inform the design of targeted professional development interventions. In doing so, the research contributes directly to strengthening the quality, relevance, and inclusiveness of digitally enabled TVET provision across diverse SSA learning environments.

Conceptually, the study was informed by the European Commission's DigCompEdu Framework, an EU recognized reference model that conceptualizes educators' digital competences as a multidimensional construct encompassing professional engagement, digital resources, teaching and learning, digital assessment literacy, level of empowering learners and the facilitation of learners' own digital skills. The framework's developmental progression model allows for the identification of competence trajectories ranging from initial awareness to innovation and leadership in digitally enriched teaching practice.



To translate this conceptual orientation into an operational research design suitable for the SSA context, the project adopted a SELFIE-inspired methodological approach. This approach supports structured self-reflection on digital practice and institutional conditions, enabling trainers to assess their own competence development while generating comparable data across participating institutions. In this way, the research provides a foundation for evidence-based decision-making at individual, organizational, and project levels.

2. Methodological Framework

2.1 Research Design and Rationale

The study employed a descriptive survey research design through the development of an online questionnaire based on the EU SELFIE-inspired self-assessment instrument. The full set of questionnaire items used in this research can be found in *Annex I*, which presents all questions addressed to TVET trainers.

Originally developed by the European Commission, the SELFIE approach is widely used to support educators and institutions in reflecting on their digital capacity and pedagogical use of educational technologies. Its emphasis on developmental self-reflection rather than external evaluation makes it particularly suitable for contexts where digital transformation processes are still evolving.

The methodological framework combined structured self-reflection, standardized data collection procedures across the five SSA countries, developmental measurement of competence maturity, and action-oriented interpretation of findings. This combination ensured that results would be both analytically robust and directly relevant to capacity-building planning.

2.2 Digital Competence Domains and Practice Dimensions

The online questionnaire operationalized trainers' digital competence through **six core domains** aligned with **DigCompEdu**. Each domain was further articulated through a series of practice descriptors (sub-areas) based on the **EU Selfie tool for teachers** capturing realistic pedagogical and professional situations encountered in TVET settings.



The first domain, **Professional Engagement**, explored how trainers use digital technologies to communicate with colleagues and learners, collaborate with educational stakeholders, manage online learning environments responsibly, and participate ethically in digital society. It also examined the extent to which trainers use available digital technologies, engage in digitally supported reflective practice and continuous professional learning, both through digital environments and specifically about the pedagogical use of digital technologies.

The second domain, **Digital Resources**, focused on trainers' capacity to search for and select criteria to identify digital resources for teaching and learning (e.g. by following a link, using keywords in a search engine, filtering resources in online repositories); create digital resources that support and enhance teaching and learning aims (e.g. digital text, images, photos, audio, video); modify existing digital resources to support and enhance teaching and learning aims, respecting copyright and licensing rules (e.g. adding a picture to text, adding new content, editing a presentation), organize digital content, enabling easy and secure access for learners and colleagues, while protecting sensitive and personal data; share digital content with respect to intellectual property and copyright rules (e.g. citing author's name, link to original source).

The third domain, **Teaching and Learning**, examined pedagogical integration of digital technologies in instructional design and facilitation. Trainers were invited to reflect on their use of digital tools to design, develop and support learning with digital technologies to enhance learning outcomes. (e.g. software programs, mobile apps and tools, on-line and cloud-based resources, peer and self-assessment, e-portfolios); provide feedback and opportunities for reflection, leading to readjustment of teaching and learning practices for both teachers and learners; foster learner collaboration for individual and collective learning; enhance students' self-regulated learning processes, foster active and autonomous learning making students more responsible for their own learning, thereby shifting the focus from teaching to learning, and experiment with emerging technologies such as artificial intelligence, simulations, robotics, or virtual environments in ethically responsible ways.

The fourth domain, **Assessment**, investigated the extent to which trainers employ digital technologies to design formative and summative assessment strategies, analyse learner performance data, and use digital feedback mechanisms to inform instructional planning and improvement.

The fifth domain, **Empowering Learners**, captured trainers' efforts to ensure inclusive and equitable access to digital learning opportunities. It examined practices related to differentiation, personalization, active learner engagement, and the use of blended or distance learning environments that extend learning beyond the physical classroom.



Finally, the sixth domain, **Facilitating Learners' Digital Competence**, addressed trainers' role in developing learners' transversal digital skills. This included supporting learners in information and data literacy, digital communication and collaboration, digital content creation, online safety and wellbeing, ethical use of technology and digital identity management, as well as problem solving and innovation through digital tools.

2.3 Instrument Structure and Administration

Data were collected through an online questionnaire administered via Google Forms. The instrument consisted of three interconnected sections. The first section introduced the purpose of the study, clarified the voluntary nature of participation, assured confidentiality and anonymity, and provided an estimated completion time. The second section gathered background information on participants' professional roles, years of training experience, primary training contexts, country affiliation, and institutional setting. The third and most substantial section invited participants to rate their competence across the six domains using a developmental scale.

The questionnaire was intentionally designed to require approximately 15 minutes to complete, thereby minimizing response fatigue and improving completion rates.

2.4 Developmental Competence Scale

All competence statements were measured using a **seven-point developmental Likert-type scale** representing progressive levels of digital competence maturity. The scale ranged from initial lack of awareness to active contribution at organizational level through innovation, mentoring, and policy influence. By capturing this progression, the instrument enabled nuanced analysis of trainers' competence trajectories rather than merely measuring frequency of technology use.

2.5 Data Collection Process

Trainers from the participating TVET institutions in Nigeria, Mozambique, Malawi, Ethiopia, and Madagascar were invited to complete the questionnaire within a three-week



data collection period, with local coordinators supporting communication, clarification of questions, and follow-up to ensure adequate participation. Participation remained fully voluntary and anonymous throughout the process.

2.6 Data Analysis Approach

A total of 35 trainers responded to the questionnaires, distributed across partner countries as follows:

- Ethiopia: 6
- Madagascar: 9
- Malawi: 5
- Mozambique: 9
- Nigeria: 6

Data collected from trainers in each country were analyzed using descriptive statistical methods. Specifically, partners calculated mean scores for each competence sub-area based on trainers' self-assessment responses, using a seven-point developmental Likert scale. For each sub-area, individual scores from all participating trainers were aggregated and divided by the total number

of respondents, resulting in a single average score per sub-area at the country level. This process enabled each national partner to generate a clear and standardized competence profile, reflecting the perceived level of digital pedagogical practice within their institution.

Following the calculation of sub-area averages, partners proceeded to determine overall scores for each core competence area. This was achieved by summing the mean scores of all sub-areas within a given competence domain—such as Professional Engagement, Digital Resources, Teaching and Learning, Digital Assessment, Empowering Learners, and Facilitating Learners' Digital Competence—and dividing the total by the number of sub-areas within that domain. This second level of aggregation allowed for a more comprehensive interpretation of digital competence strengths and development needs at the institutional level.

To enhance analytical clarity and ensure meaningful interpretation of the results, the calculated mean scores were mapped against the DigCompEdu progression model (A1–C2). This framework was used to classify competence development stages, ranging from



Newcomer to Pioneer. For further clarity, these levels were grouped into interpretation bands, corresponding to specific mean score ranges on the 7-point Likert scale (1–7).

Table 1 below presents the interpretation bands used in this analysis, linking mean score ranges from the 7-point Likert scale to corresponding DigCompEdu levels and descriptive competence stages. This categorization supports a consistent and transparent interpretation of results across all participating countries.

Interpretation Bands and DigCompEdu Levels

Mean Score Range	Interpretation Band	DigCompEdu Level	Description
1.0 – 1.9	Very limited use	A1 – Newcomer	Minimal awareness or use of digital technologies; reliance on others; no systematic application.
2.0 – 2.9	Initial use	A2 – Explorer	Experimental and occasional use of digital tools; limited confidence and structure.
3.0 – 3.9	Emerging use	B1 – Integrator	Regular but basic use of digital technologies; integration into professional practices remains partial and inconsistent.
4.0 – 4.9	Functional use	B2 – Expert	Confident, purposeful, and effective use of digital technologies; practices are embedded but not yet innovative or strategic.
5.0 – 5.9	Advanced use	C1 – Leader	Strategic, reflective, and collaborative use; educators support others and contribute to organizational development.
6.0 – 7.0	Transformative use	C2 – Pioneer	Innovative, critical, and transformative use of digital technologies; educators drive change and innovation at system level.

Table1: Interpretation Bands and DigCompEdu Levels

3. Country analysis

3.1 Ethiopia

Background Information

The questionnaire was completed by six participants working as VET/TVET trainers or instructors, representing a varied range of professional experience within the Ethiopian TVET sector. Early-career professionals were well represented, with 33.3% of respondents reporting 1–3 years of experience, while an additional 16.7% had less than one year of professional practice. Mid-career practitioners also formed a significant



proportion of the sample, as 33.3% of participants indicated 8–15 years of experience in TVET. Furthermore, 16.7% of respondents were highly experienced trainers with more than 15 years of professional practice, contributing valuable long-term perspectives on digital teaching and institutional development. Overall, this distribution reflects a balanced mix of emerging, mid-career, and highly experienced TVET professionals, allowing the study to capture diverse viewpoints on digital pedagogical competence and the integration of digital technologies across different stages of professional development in the Ethiopian TVET context.

Analysis of Competence Sub-Areas

Table 2 presents the mean scores for each DigCompEdu competence sub-area, offering a detailed overview of educators' self-perceived digital pedagogical competence in Ethiopia. The table illustrates performance across all competence domains, linking mean scores to interpretation bands and corresponding DigCompEdu levels. This allows for a nuanced understanding of strengths and gaps in specific areas of digital practice.

Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement				
PE1	Organizational communication	4.0	Functional use	B2 – Expert
PE2	Online learning environments	3.5	Emerging use	B1 – Integrator
PE3	Professional collaboration	3.7	Emerging use	B1 – Integrator
PE4	Digital technologies & infrastructure	4.3	Functional use	B2 – Expert
PE5	Reflective practice	3.8	Emerging use	B1 – Integrator
PE6	Digital life	3.8	Emerging use	B1 – Integrator
PE7	Professional learning (through digital tech)	4.5	Functional use	B2 – Expert
PE8	Professional learning (about digital tech)	4.0	Functional use	B2 – Expert
Digital Resources				
DR1	Searching and selecting resources	4.0	Functional use	B2 – Expert
DR2	Creating digital resources	3.8	Emerging use	B1 – Integrator
DR3	Modifying digital resources	3.7	Emerging use	B1 – Integrator



Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
DR4	Managing digital content	3.8	Emerging use	B1 – Integrator
DR5	Sharing digital resources	3.7	Emerging use	B1 – Integrator
Teaching and Learning				
TL1	Teaching with digital technologies	3.3	Emerging use	B1 – Integrator
TL2	Guidance, feedback & reflection	3.5	Emerging use	B1 – Integrator
TL3	Collaborative learning	3.7	Emerging use	B1 – Integrator
TL4	Self-regulated learning	3.3	Emerging use	B1 – Integrator
TL5	Emerging technologies	3.0	Emerging use	B1 – Integrator
Digital Assessment				
DA1	Assessment strategies	2.7	Initial use	A2 – Explorer
DA2	Analyzing learning data	2.7	Initial use	A2 – Explorer
DA3	Feedback and planning	2.7	Initial use	A2 – Explorer
Empowering Learners				
EL1	Accessibility and inclusion	3.2	Emerging use	B1 – Integrator
EL2	Differentiation & personalization	3.2	Emerging use	B1 – Integrator
EL3	Actively engaging learners	3.5	Emerging use	B1 – Integrator
EL4	Blended learning	3.0	Emerging use	B1 – Integrator
Facilitating Learners' Digital Competence				
FLDC1	Information & data literacy	3.3	Emerging use	B1 – Integrator
FLDC2	Communication & collaboration	3.8	Emerging use	B1 – Integrator
FLDC3	Content creation	2.3	Initial use	A2 – Explorer
FLDC4	Safety & wellbeing	2.7	Initial use	A2 – Explorer
FLDC5	Responsible use	3.2	Emerging use	B1 – Integrator
FLDC6	Problem solving	3.2	Emerging use	B1 – Integrator

Table 2: Mean score of Sub-Core Areas/Ethiopia

Professional Engagement



Results for Professional Engagement indicate moderate levels of digital pedagogical competence, with half sub-areas positioned within the Functional (B2 – Expert) and half Emerging (B1 – Integrator) levels. Higher scores in organizational communication (4.0), digital technologies and institutional infrastructure (4.3), and professional learning through digital technologies (4.5) suggest that educators are able to use digital tools purposefully to support communication, access institutional systems, and engage in professional development activities. However, lower scores in reflective practice (3.8), digital life (3.8), professional collaboration (3.7), and engagement with online learning environments (3.5) indicate that digital technologies are not yet fully embedded in collaborative and reflective professional processes. Overall, the findings suggest that while educators demonstrate growing confidence in digital professional engagement, there remains scope to strengthen strategic and collaborative use of digital tools.

Digital Resources

The Digital Resources domain reflects mainly Emerging levels of competence, indicating that educators are beginning to integrate digital content into teaching but may still require support in resource development and sharing practices. While searching and selecting digital resources (4.0) shows functional use, lower scores in creating (3.8) and managing digital content (3.8) suggest that digital resource design remains relatively basic and context-dependent. Sharing and modifying digital resources records a lower mean score (3.7). This finding suggests that educators may face challenges in sharing digital content in ways that respect intellectual property and copyright requirements, such as properly citing authors, linking to original sources, or understanding licensing conditions. Similarly, the relatively low confidence in modifying existing digital resources — for example by adding visual elements, updating content, or editing presentations — indicates a need for further capacity building in pedagogically meaningful adaptation of materials while complying with copyright and licensing rules.

Teaching and Learning

The Teaching and Learning domain in Ethiopia reflects consistently emerging competence (B1 – Integrator) across all sub-areas, indicating that educators are in the early stages of integrating digital technologies into pedagogical practices, with implementation remaining partial and not yet systematic. Scores in teaching with digital technologies (3.3) suggest that digital tools are being used to support instruction, but their integration into structured instructional design and pedagogical strategies is still developing. Similarly, guidance, feedback, and reflection (3.5) indicate that digital technologies are used to provide feedback, though not yet in a consistent, personalized, or data-informed way. Collaborative learning (3.7) shows some use of digital tools to support interaction and group work, but these practices are not yet fully embedded or



optimized. Likewise, self-regulated learning (3.3) suggests limited use of digital technologies to promote learner autonomy and independent learning processes. The lowest score is observed in emerging technologies (3.0), indicating minimal integration of advanced tools such as AI, simulations, or immersive technologies, as well as limited awareness of their pedagogical potential.

Digital Assessment

Digital assessment emerges as one of the weakest domains, with all sub-areas positioned at the Initial use level (A2 – Explorer). Mean scores of 2.7 across assessment strategies, analyzing learning data, and feedback and planning suggest that the integration of digital technologies into assessment practices is still at an experimental stage. Educators may use digital tools occasionally for monitoring learner progress or providing feedback, but systematic use of digital assessment for formative and summative purposes, as well as data-informed instructional planning, appears limited. This highlights a key priority area for professional development.

Empowering Learners

The Empowering Learners domain in Ethiopia reflects consistently emerging competence (B1 – Integrator) across all sub-areas, indicating that educators are at an early stage of using digital technologies to support learner-centered approaches, with practices still developing and not yet fully embedded. Scores in accessibility and inclusion (3.2) suggest that while some efforts are made to ensure access to digital learning, significant challenges remain in addressing contextual, infrastructural, and diverse learner needs. Similarly, differentiation and personalization (3.2) indicate limited use of digital tools to support individual learning pathways and adaptive instruction. Actively engaging learners (3.5) shows that digital technologies are being used to enhance participation and motivation to some extent, but these practices are not yet consistently applied or pedagogically structured. Meanwhile, blended learning (3.0) represents the lowest score, highlighting that the integration of online and face-to-face learning environments is still at a very early stage. Strengthening educators' knowledge in blended learning, ability to design differentiated digital learning pathways and ensure equitable access to learning opportunities will be important for enhancing learner participation and success.

Facilitating Learners' Digital Competence

The Facilitating Learners' Digital Competence domain in Ethiopia reflects overall emerging competence (B1 – Integrator), with some sub-areas falling at initial levels (A2 – Explorer). This indicates that educators are beginning to integrate digital competence into learning activities, but practices remain limited and uneven. Moderate performance in communication and collaboration (3.8) suggests that digital tools are used to support interaction among learners, although these practices are not yet consistently structured.



Similarly, information and data literacy (3.3) indicate that learners are exposed to basic activities involving searching and managing digital information, but these skills are not yet systematically developed. Scores in responsible use (3.2) and problem solving (3.2) further reflect emerging competence, suggesting that learners are introduced to ethical use of technology and basic problem-solving tasks, though more structured and applied approaches are needed. However, significant gaps are evident in digital content creation (2.3 – A2 Explorer) and safety and wellbeing (2.7 – A2 Explorer). These low scores indicate limited opportunities for learners to create digital artefacts and insufficient focus on online safety, risk awareness, and digital wellbeing.

Core-Level Analysis of Digital Pedagogical Competence

The DigCompEdu assessment results for Ethiopia indicate that educators are positioned predominantly at the Emerging level of digital competence (B1 – Integrator) across most core areas. This suggests that while digital technologies are being incorporated into teaching and professional practices, their use remains inconsistent, exploratory, and often limited to basic or functional applications rather than strategic pedagogical integration.

The strongest performance is observed in Professional Engagement (mean = 3.95), indicating that educators are increasingly using digital technologies for communication, collaboration, and professional development. While these practices are becoming more consistent, they are still evolving toward more reflective, networked, and leadership-oriented engagement.

Similarly, Digital Resources (mean = 3.80) reflects an emerging ability to identify, create, and adapt digital materials for teaching and learning. Educators show growing confidence in using and sharing resources, though practices such as advanced content creation, adaptation, and critical selection are not yet fully optimized or consistently applied.

Teaching and Learning (mean = 3.36) also falls within the emerging level, suggesting that digital tools are being integrated into instructional design and classroom practice. However, this integration remains relatively basic and functional, with limited evidence of transformative pedagogical approaches, such as fostering autonomous learning, collaboration, or the use of advanced technologies.

Empowering Learners (mean = 3.23) indicates that educators are beginning to use digital technologies to support inclusion, engagement, and personalized learning. While there is some effort to address diverse learner needs, these practices are not yet systematically embedded or strategically designed to maximize learner autonomy and participation.



Facilitating Learners' Digital Competence (mean = 3.08) further reflects emerging use, showing that educators are starting to support learners in developing essential digital skills. However, this support remains limited in scope and depth, with less emphasis on higher-order competences such as digital creativity, critical thinking, and responsible digital citizenship.

The weakest performance is observed in Digital Assessment (mean = 2.70), which falls within the Initial use (A2 – Explorer) level. This suggests that the use of digital technologies for assessment is still at an early stage, with limited application of data-driven approaches, digital feedback mechanisms, or systematic use of assessment tools to inform teaching and learning.

Table 3 summarizes the aggregated results across the six core DigCompEdu competence areas, providing a consolidated view of educators' digital pedagogical competence in Ethiopia

Core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement	3.95	Emerging use	B1 – Integrator
Digital Resources	3.80	Emerging use	B1 – Integrator
Teaching and Learning	3.36	Emerging use	B1 – Integrator
Digital Assessment	2.70	Initial use	A2 – Explorer
Empowering Learners	3.23	Emerging use	B1 – Integrator
Facilitating learners' digital competence	3.08	Emerging use	B1 – Integrator

Table 3: Mean score of Core Areas/Ethiopia

Overall Interpretation of Results

Overall, the results indicate that Ethiopian educators' function primarily as "Digital Integrators" (B1 level), demonstrating increasing engagement with digital technologies across professional practice, resource use, and teaching processes. Digital tools are being incorporated into educational activities; however, their use remains largely supportive rather than transformative, and is not yet consistently aligned with innovative, learner-centered pedagogical approaches.

At the same time, the findings reveal the presence of several competence areas at the Initial Use level (A2 – Explorer), highlighting important developmental gaps. Most notably, the entire Digital Assessment domain — including assessment strategies, learning data analysis, and feedback-driven instructional planning — remains at an exploratory stage.



This suggests that digital technologies are rarely used to support formative assessment practices, personalized feedback cycles, or evidence-based teaching adjustments.

Similarly, within the domain of Facilitating Learners' Digital Competence, very low scores in digital content creation (2.3) and digital safety and wellbeing (2.7) indicate that educators may not yet be systematically supporting learners in developing creative, critical, and responsible digital participation skills. These findings point to a limited integration of digital citizenship education and computational or creative digital production tasks within teaching practices.

Across the remaining domains — including Teaching and Learning, Empowering Learners, and Digital Resources — competence levels are generally positioned within the Emerging (B1) range, suggesting that educators are experimenting with digital pedagogies but have not yet deep knowledge on emerging technologies neither consolidated strategic instructional design practices such as blended learning.

Conversely, several sub-areas demonstrate Functional Use (B2 – Expert), particularly in organizational communication, use of institutional digital infrastructure, and engagement in professional learning through and about digital technologies. These strengths indicate that educators are capable of operating effectively within digital professional ecosystems and show readiness to progress towards more reflective, innovative, and leadership-oriented uses of technology.

Implications for Professional Development

The identification of professional development priorities is based on the analysis of the sub-core competence areas, as presented in the results above. By examining the lowest-performing sub-areas within each domain—particularly those positioned at Initial use (A2 – Explorer) and the lower range of Emerging use (B1 – Integrator)—it is possible to pinpoint specific gaps that require targeted intervention.

Priority Areas (Critical Gaps)



- Digital assessment practices (2.70) – limited ability to design, implement, and use digital assessment and feedback effectively
- Learners' digital content creation (2.30) – weak support for developing students' skills in creating digital content
- Online safety and wellbeing (2.70) – insufficient emphasis on safe, ethical, and responsible digital use
- Emerging technologies in teaching (3.0) – limited use of innovative digital tools and advanced technologies in instruction (e.g AI, VR)
- Blended learning approaches (3.0) – early-stage implementation of hybrid and flexible learning models
- Responsible use and problem solving (3.2) – moderate but underdeveloped support for ethical digital behavior and problem-solving skills.
- Accessibility and inclusion (3.2) – limited capacity to systematically ensure equitable access to digital learning for all learners, including those with diverse needs and backgrounds
- Differentiation and personalization (3.2) – insufficient use of digital technologies to adapt teaching strategies, content, and learning pathways to individual learner needs and preferences
- Teaching with digital technologies (3.3) – limited integration of digital tools into instructional design and classroom practice
- Self-regulated learning (3.3) – insufficient use of digital technologies to support learner autonomy and independent learning
- Information and data literacy (3.3) – limited support for developing learners' ability to search, evaluate, manage and interpret information and data in digital environments.

3.2 Madagascar

Background Information

The questionnaire was completed by nine participants working as VET/TVET trainers or practitioners in Madagascar, representing a diverse range of professional roles and experience within the TVET sector. A slight majority of respondents (55.6%) identified as VET/TVET practitioners while the remaining 44.4% were VET/TVET trainers or instructors, ensuring a balanced representation of both practical and instructional perspectives.



In terms of professional experience, the sample is predominantly composed of early-career professionals, with 55.6% of participants reporting 1–3 years of experience. A further 33.3% indicated 4–7 years of experience, representing emerging mid-career practitioners. Only 11.1% of respondents reported less than one year of experience, indicating limited representation of newcomers to the profession.

Analysis of Competence Sub-Areas

Table 4 presents the mean scores for each DigCompEdu competence sub-area, offering a detailed overview of educators' self-perceived digital pedagogical competence in Madagascar. The table illustrates performance across all competence domains, linking mean scores to interpretation bands and corresponding DigCompEdu levels. This allows for a nuanced understanding of strengths and gaps in specific areas of digital practice.

Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement				
PE1	Organizational communication	5.6	Advanced use	C1 – Leader
PE2	Online learning environments	5.3	Advanced use	C1 – Leader
PE3	Professional collaboration	5.3	Advanced use	C1 – Leader
PE4	Digital technologies & infrastructure	5.5	Advanced use	C1 – Leader
PE5	Reflective practice	5.1	Advanced use	C1 – Leader
PE6	Digital life	5.5	Advanced use	C1 – Leader
PE7	Professional learning (through digital tech)	5.4	Advanced use	C1 – Leader
PE8	Professional learning (about digital tech)	5.5	Advanced use	C1 – Leader
Digital Resources				
DR1	Searching and selecting resources	5.3	Advanced use	C1 – Leader
DR2	Creating digital resources	5.5	Advanced use	C1 – Leader
DR3	Modifying digital resources	5.5	Advanced use	C1 – Leader
DR4	Managing digital content	5.3	Advanced use	C1 – Leader
DR5	Sharing digital resources	5.7	Advanced use	C1 – Leader



Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Teaching and Learning				
TL1	Teaching with digital technologies	5.4	Advanced use	C1 – Leader
TL2	Guidance, feedback & reflection	5.4	Advanced use	C1 – Leader
TL3	Collaborative learning	5.9	Advanced use	C1 – Leader
TL4	Self-regulated learning	6.1	Transformative use	C2 – Pioneer
TL5	Emerging technologies	5.4	Advanced use	C1 – Leader
Digital Assessment				
DAS1	Assessment strategies	5.8	Advanced use	C1 – Leader
DAS2	Analysing learning data	5.8	Advanced use	C1 – Leader
DAS3	Feedback and planning	6	Transformative use	C2 – Pioneer
Empowering Learners				
EL1	Accessibility and inclusion	5.2	Advanced use	C1 – Leader
EL2	Differentiation & personalization	5.4	Advanced use	C1 – Leader
EL3	Actively engaging learners	5.4	Advanced use	C1 – Leader
EL4	Blended learning	5.1	Advanced use	C1 – Leader
Facilitating Learners' Digital Competence				
FLDC1	Information & data literacy	5.3	Advanced use	C1 – Leader
FLDC2	Communication & collaboration	5.8	Advanced use	C1 – Leader
FLDC3	Digital content creation	4.0	Functional use	B2 – Expert
FLDC4	Safety & wellbeing	3.8	Emerging use	B1 – Integrator
FLDC5	Responsible use	5.3	Advanced use	C1 – Leader
FLDC6	Problem solving	5.1	Advanced use	C1 – Leader

Table 4: Mean score of Sub-Core Areas/Madagascar

Professional Engagement



The Professional Engagement domain in Madagascar reflects advanced competence (C1 – Leader) across all sub-areas, indicating a highly developed, strategic, and reflective use of digital technologies in professional practice. Educators demonstrate particularly strong performance in organizational communication (5.6), digital technologies and infrastructure (5.5), and digital life (5.5), suggesting that digital tools are deeply embedded in institutional processes and everyday professional activities. This highlights their ability to effectively manage communication, operate within digital ecosystems, and contribute to organizational efficiency. Similarly, high scores in online learning environments (5.3) and professional collaboration (5.3) indicate that educators actively engage in digital platforms for teaching, networking, and knowledge exchange, fostering a collaborative professional culture. Professional learning through digital technologies (5.4) and professional learning about digital technologies (5.5) further demonstrate a strong commitment to continuous professional development, with educators using digital tools both as a means and an object of learning. This reflects a proactive approach to staying updated with innovations and improving practice. In addition, reflective practice (5.1) at an advanced level indicates that educators are not only using digital technologies but are also critically evaluating and refining their pedagogical approaches, contributing to ongoing professional growth.

Digital Resources

The Digital Resources domain in Madagascar reflects advanced competence (C1 – Leader) across all sub-areas, indicating that educators demonstrate a strategic, confident, and collaborative approach to the use and management of digital content. Educators show strong performance in searching and selecting digital resources (5.3), highlighting their ability to apply effective search strategies and critical selection criteria to identify high-quality materials for teaching and learning. This suggests a well-developed capacity to navigate and evaluate digital information. Similarly, creating digital resources (5.5) and modifying digital resources (5.5) are at an advanced level, indicating that educators are not only adapting existing materials but are also designing and producing original, pedagogically sound digital content. Their ability to modify resources in line with copyright and licensing requirements further reflects a high level of digital maturity. Managing digital content (5.3) also demonstrates strong competence, with educators effectively organizing, storing, and securing digital materials to ensure easy access and data protection for both learners and colleagues. Notably, sharing digital resources (5.7) represents the highest score within this domain, highlighting a strong culture of collaboration and openness. Educators actively share materials while respecting



intellectual property and copyright rules, contributing to knowledge exchange and the wider educational community.

professional

Teaching and Learning

The Teaching and Learning domain in Madagascar reflects predominantly advanced competence (C1 – Leader), with one sub-area reaching transformative level (C2 – Pioneer). This indicates that educators are not only integrating digital technologies effectively but are also driving innovation and transformation in pedagogical practices. Strong performance in teaching with digital technologies (5.4) and guidance, feedback, and reflection (5.4) demonstrates that educators are strategically using digital tools to design instruction and support continuous, meaningful feedback processes. These practices suggest a well-structured and reflective approach to digital pedagogy.

A particularly high score is observed in collaborative learning (5.9), indicating that educators excel in using digital technologies to foster interactive, participatory, and peer-based learning environments, supporting both individual and collective knowledge construction. Notably, self-regulated learning (6.1 – C2 Pioneer) represents a transformative strength, showing that educators are enabling learners to take full ownership of their learning processes. In addition, emerging technologies (5.4) are being effectively integrated, suggesting that educators are confidently using tools such as AI, simulations, or other innovative technologies to enhance learning experiences.

Digital Assessment

The Digital Assessment domain in Madagascar reflects highly advanced competence, with most sub-areas at C1 – Leader level and one reaching transformative use (C2 – Pioneer). This indicates that educators are using digital technologies in a strategic, data-driven, and innovative way to support assessment practices. Strong performance in assessment strategies (5.8) demonstrates that educators effectively integrate digital tools into evaluation processes, enabling diverse and flexible assessment methods. Similarly, analyzing learning data (5.8) highlights a well-developed capacity to interpret learner data, supporting informed decision-making and continuous monitoring of student progress. Notably, feedback and planning (6.0 – C2 Pioneer) represents a transformative strength, indicating that educators are using digital technologies to provide personalized, timely, and actionable feedback, while dynamically adapting teaching strategies based on learner needs. This reflects a highly advanced approach to formative assessment and adaptive learning.



Empowering Learners

The Empowering Learners domain in Madagascar reflects consistently advanced competence (C1 – Leader) across all sub-areas, indicating that educators are strategically using digital technologies to support inclusive, learner-centered, and flexible learning environments. Strong performance in differentiation and personalization (5.4) and actively engaging learners (5.4) demonstrates that educators effectively use digital tools to address diverse learning needs and foster active participation, creativity, and motivation. This suggests well-developed practices that support individual learning pathways and student-centered pedagogies. Similarly, accessibility and inclusion (5.2) indicate that educators are making deliberate efforts to ensure that digital learning is accessible to all learners, taking into account potential barriers such as limited access, diverse abilities, or contextual challenges. Blended learning (5.1) further highlights educators' ability to integrate online and face-to-face learning environments, ensuring continuity and flexibility in learning beyond the classroom.

Facilitating Learners' Digital Competence

The Facilitating Learners' Digital Competence domain in Madagascar reflects predominantly advanced competence (C1 – Leader), with some variation across sub-areas. This indicates that educators are effectively supporting learners in developing key digital skills, while a few areas remain at earlier stages of integration. Strong performance in communication and collaboration (5.8) highlights educators' ability to implement learning activities that promote interaction, teamwork, and respectful digital participation. Similarly, information and data literacy (5.3) show that learners are being guided to search, evaluate, and manage digital information effectively.

High scores in responsible use (5.3) and problem solving (5.1) further demonstrate that educators are fostering learners' ability to use digital technologies ethically, manage their digital identity, and apply technology creatively to solve problems and develop innovative solutions. However, digital content creation (4.0 – B2 Expert), while functional, suggests that learners are engaged in producing digital artefacts but may require further support to develop more advanced creative and production skills. The lowest score is observed in safety and wellbeing (3.8 – B1 Integrator), indicating that this area remains at an emerging level. This suggests a need to strengthen learners' understanding of online safety, risk awareness, and digital wellbeing, including social and psychological aspects of technology use.

Core-Level Analysis of Digital Pedagogical Competence



The mean scores across the DigCompEdu core competence areas indicate that educators demonstrate consistently high and advanced levels of digital pedagogical competence, with most domains positioned at Advanced use (C1 – Leader) and one at Functional use (B2 – Expert). This suggests that digital technologies are not only embedded in practice, but are also used in a strategic, reflective, and collaborative way, contributing to organizational development and innovation.

The strongest performance is observed in Digital Assessment (mean = 5.9), indicating that educators are using digital technologies in a strategic and data-driven manner to monitor progress, analyze learning, and provide adaptive feedback. This reflects a shift beyond basic use towards informed and responsive teaching practices.

Similarly, Teaching and Learning (mean = 5.6) and Digital Resources (mean = 5.5) demonstrate advanced competence, highlighting educators' ability to design, implement, and adapt digital pedagogies and resources strategically. These practices are not only embedded but also reflective and continuously improved, supporting effective and innovative learning environments.

Professional Engagement (mean = 5.4) further reinforces this pattern, showing that educators actively participate in collaborative networks, digital communication, and continuous professional development, often contributing to peer learning and organizational growth.

Empowering Learners (mean = 5.3) also reflects advanced use, indicating that educators are able to strategically support inclusion, engagement, and personalized learning, moving beyond basic implementation towards more systematic learner-centered approaches.

The only domain at Functional use (B2 – Expert) is Facilitating learners' digital competence (mean = 4.9). This suggests that while educators are confident and effective in integrating digital tools, the systematic development of learners' own digital competences—such as creativity, collaboration, and safe digital participation—remains embedded but not yet fully strategic or innovative.

Core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement	5.4	Advanced use	C1 – Leader
Digital Resources	5.5	Advanced use	C1 – Leader
Teaching and Learning	5.6	Advanced use	C1 – Leader
Digital Assessment	5.9	Advanced use	C1 – Leader
Empowering Learners	5.3	Advanced use	C1 – Leader
Facilitating learners' digital competence	4.9	Functional use	B2 – Expert

Table 5: Mean score of Core Areas/Madagascar



Overall Interpretation of Results

The analysis of both sub-areas and core competence areas indicates that educators demonstrate consistently high levels of digital pedagogical competence, with the majority of sub-areas positioned at Advanced use (C1 – Leader) and several reaching Transformative use (C2 – Pioneer). This reflects a mature and innovation-oriented digital education environment, where technologies are used strategically, reflectively, and collaboratively to enhance teaching, learning, and organizational development.

At the sub-area level, Professional Engagement is fully developed at the advanced level, with particularly strong performance in organizational communication (5.6), digital infrastructure (5.5), and continuous professional learning (5.4–5.5). This indicates that educators are not only confident users of digital tools but also active contributors to professional communities and institutional digital ecosystems, often supporting peers and fostering collaboration.

Similarly, Digital Resources shows consistently advanced performance across all sub-areas, especially in sharing (5.7), creating (5.5), and modifying resources (5.5). This highlights educators' capacity to act as creators, curators, and disseminators of high-quality digital content, contributing to open and collaborative educational practices.

In the Teaching and Learning domain, all sub-areas are at advanced level, with self-regulated learning (6.1 – C2 Pioneer) representing a transformative strength. This indicates that educators are enabling learners to take full ownership of their learning processes, supported by digital tools that foster autonomy, reflection, and personalized learning. Strong performance in collaborative learning (5.9) and emerging technologies (5.4) further confirms a highly innovative and learner-centered pedagogical approach.

Digital Assessment is another key strength, with feedback and planning (6.0 – C2 Pioneer) reaching transformative level. This demonstrates that educators are using digital technologies to deliver personalized, timely, and adaptive feedback, and to continuously adjust teaching strategies based on learning data and analytics.

The Empowering Learners domain is consistently at the advanced level, indicating that educators effectively support inclusive, engaging, and personalized learning environments, including well-developed blended learning practices and active learner participation.

In Facilitating Learners' Digital Competence, most sub-areas reach advanced level, particularly communication and collaboration (5.8) and responsible use (5.3), showing strong support for learners' digital participation and ethical awareness. However, digital content creation (4.0 – B2) and especially safety and wellbeing (3.8 – B1) remain comparatively lower, indicating that learners are not yet fully supported in developing creative production skills and comprehensive digital safety awareness.



At the core area level, all domains except one reach Advanced use (C1 – Leader), confirming a systemic and strategic integration of digital technologies across professional and pedagogical practices. The only domain at a slightly lower level is Facilitating learners’ digital competence, which remains at the Functional/Emerging boundary, highlighting a relative gap between educators’ own digital proficiency and their ability to systematically develop learners’ digital skills.

Implications for Professional Development

The identification of professional development priorities is based on the analysis of the sub-core competence areas, as presented in the results above. Despite overall high performance, the below areas require targeted attention to ensure balanced and comprehensive competence development:

Medium Priority areas

Despite overall high performance, these areas require targeted attention to ensure balanced and comprehensive competence development:

- Safety and wellbeing (3.8) – insufficiently developed practices to support learners’ safe, responsible, and healthy use of digital technologies, including awareness of online risks and digital wellbeing
- Digital content creation (learners’ competence) (4.0) – while functional, learners’ opportunities to create and produce digital artefacts need to be strengthened to reach advanced and innovative levels

3.3 Malawi

Background Information

The questionnaire in Malawi was completed by five participants working in the Technical and Vocational Education and Training (TVET) sector, primarily in roles as TVET trainers or instructors, with one participant identified as a TVET practitioner (e.g., field-based



trainer, technical expert, or community trainer). All respondents reported a professional experience range of 8–15 years, indicating that the sample is composed predominantly of mid-career professionals with substantial practical exposure to vocational training delivery and institutional practices.

Analysis of Competence Sub-Areas

Table 6 presents the mean scores for each DigCompEdu competence sub-area, offering a detailed overview of educators' self-perceived digital pedagogical competence in Malawi. The table illustrates performance across all competence domains, linking mean scores to interpretation bands and corresponding DigCompEdu levels. This allows for a nuanced understanding of strengths and gaps in specific areas of digital practice.

Sub-core Area Mean Scores

Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement				
PE1	Organizational communication	4.8	Functional use	B2 – Expert
PE2	Online learning environments	4.6	Functional use	B2 – Expert
PE3	Professional collaboration	4.8	Functional use	B2 – Expert
PE4	Digital technologies & infrastructure	5.0	Advanced use	C1 - Leader
PE5	Reflective practice	3.8	Emerging use	B1 – Integrator
PE6	Digital life	4.4	Functional use	B2 – Expert
PE7	Professional learning (through digital tech)	4.2	Functional use	B2 – Expert
PE8	Professional learning (about digital tech)	3.8	Emerging use	B1 – Integrator
Digital Resources				
DR1	Searching and selecting resources	4.2	Functional use	B2 – Expert
DR2	Creating digital resources	4.6	Functional use	B2 – Expert



Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
DR3	Modifying digital resources	4.2	Functional use	B2 – Expert
DR4	Managing digital content	4.2	Functional use	B2 – Expert
DR5	Sharing digital resources	3.6	Emerging use	B1 – Integrator
Teaching and Learning				
TL1	Teaching with digital technologies	3.4	Emerging use	B1 – Integrator
TL2	Guidance, feedback & reflection	3.8	Emerging use	B1 – Integrator
TL3	Collaborative learning	4.2	Functional use	B2 – Expert
TL4	Self-regulated learning	4.2	Functional use	B2 – Expert
TL5	Emerging technologies	3.0	Emerging use	B1 – Integrator
Digital Assessment				
DAS1	Assessment strategies	4.4	Functional use	B2 – Expert
DAS2	Analyzing learning data	4.0	Functional use	B2 – Expert
DAS3	Feedback and planning	3.4	Emerging use	B1 – Integrator
Empowering Learners				
EL1	Accessibility and inclusion	3.8	Emerging use	B1 – Integrator
EL2	Differentiation & personalization	3.6	Emerging use	B1 – Integrator
EL3	Actively engaging learners	3.8	Emerging use	B1 – Integrator
EL4	Blended learning	3.4	Emerging use	B1 – Integrator
Facilitating Learners' Digital Competence				
FLDC1	Information & data literacy	4.0	Functional use	B2 – Expert
FLDC2	Communication & collaboration	3.0	Emerging use	B1 – Integrator
FLDC3	Digital content creation	3.0	Emerging use	B1 – Integrator
FLDC4	Safety & wellbeing	3.6	Emerging use	B1 – Integrator
FLDC5	Responsible use	3.8	Emerging use	B1 – Integrator
FLDC6	Problem solving	4.0	Functional use	B2 – Expert

Table 6: Mean score of Sub-Core Areas/Malawi

Professional Engagement



Results for Professional Engagement indicate relatively strong levels of digital pedagogical competence, with the majority of sub-areas positioned within the Functional use level (B2 – Expert). High scores in organizational communication (4.8), professional collaboration (4.8), use of digital technologies and infrastructure (5.0), and online-learning environments (4.6) suggest that educators are confident in using digital tools to support institutional communication, participate in professional networks, and operate within digital professional ecosystems. Similarly, functional levels of competence in professional learning through digital technologies (4.2) and digital life (4.4) indicate growing capacity to engage with digital innovation and continuous professional development.

However, slightly lower scores in reflective practice (3.8) and professional learning about digital technologies (3.8) point to areas where more structured reflection on digital pedagogical practices and deeper conceptual understanding of technology integration could be strengthened.

Digital Resources

The Digital Resources domain reflects generally Functional competence, indicating that educators are able to search for, create, modify, and manage digital content with confidence. Scores for searching and selecting resources (4.2), creating digital resources (4.6), modifying resources (4.2), and managing digital content (4.2) demonstrate that digital materials are being used purposefully to support teaching and learning processes. Nevertheless, the lower score in sharing digital resources (3.6) suggests that collaborative resource exchange and engagement with open educational practices remain at an emerging stage. Educators may benefit from further support in understanding intellectual property and copyright rules.

Teaching and Learning

The Teaching and Learning domain in Malawi reflects a combination of emerging (B1 – Integrator) and functional (B2 – Expert) competence, indicating that educators are beginning to integrate digital technologies into pedagogy, with stronger performance in learner-centered practices. Educators show solid competence in collaborative learning (4.2) and self-regulated learning (4.2), both at a functional level. This suggests that digital tools are being effectively used to promote learner interaction, participation, and autonomy, supporting a gradual shift towards student-centered learning approaches.



However, teaching with digital technologies (3.4) remains at an emerging level, indicating that while digital tools are used, their integration into instructional design and teaching strategies is still developing. Similarly, guidance, feedback, and reflection (3.8) suggest that digital technologies support feedback processes, but these are not yet fully systematic or personalized. The lowest score is observed in emerging technologies (3.0 – B1 Integrator), highlighting limited use of advanced tools such as AI, simulations, or virtual environments, as well as a need to strengthen understanding of their pedagogical and ethical applications.

Digital Assessment

The Digital Assessment domain represents a relatively stronger area compared to other competence domains. Functional scores in assessment strategies (4.4) and analysis of learning data (4.0) indicate that educators are able to use digital technologies to support monitoring of learner progress and evaluation activities. However, the lower score in feedback and instructional planning (3.4) suggests that the systematic use of assessment data to inform pedagogical decision-making and personalize learning experiences is still emerging. Strengthening formative assessment practices and data-informed teaching strategies may further enhance the impact of digital assessment approaches.

Empowering Learners

The Empowering Learners domain in Malawi reflects consistently emerging competence (B1 – Integrator) across all sub-areas, indicating that educators are in the process of integrating digital technologies to support learner-centered education, but practices remain developing and not yet fully embedded.

Performance in accessibility and inclusion (3.8) suggests that some efforts are being made to ensure access to digital learning, although challenges related to infrastructure, connectivity, and diverse learner needs may still limit full inclusion. Similarly, differentiation and personalization (3.6) indicates that while digital tools are used to support varied learning needs, the implementation of adaptive and individualized learning pathways remains partial.

Actively engaging learners (3.8) shows that educators are using digital technologies to enhance participation and motivation, but these practices are not yet consistently applied across learning contexts. Meanwhile, blended learning (3.4) represents the lowest score,



highlighting that the integration of online and face-to-face environments is still at an early stage of development.

learning

Facilitating Learners' Digital Competence

This domain reflects uneven competence development, combining Functional and Emerging levels. Functional scores in information and data literacy (4.0) and problem solving (4.0) indicate that educators are able to support learners in developing foundational digital skills and applying technology to practical challenges. However, lower scores in communication and collaboration (3.0), digital content creation (3.0), safety and wellbeing (3.6), and responsible use (3.8) suggest that more advanced aspects of digital competence, creative production, and safe online participation — are still developing. This highlights the importance of strengthening structured approaches to integrating learners' digital competence development across curricula.

Core-Level Analysis of Digital Pedagogical Competence

Malawi presents a moderately strong and relatively balanced digital competence profile, with clear strengths in foundational areas and some remaining gaps in pedagogical and learner-focused dimensions.

The highest scores are observed in Professional Engagement (4.4) and Digital Resources (4.2), both reaching B2 – Expert (Functional use). This indicates that educators in Malawi are confident in using digital technologies for communication, collaboration, and professional development. They are also confident in identifying, selecting, and managing digital resources for teaching. These results suggest a solid foundation for digital integration, with teachers already actively engaging with digital tools in their professional practice.

The remaining core areas—Teaching and Learning (3.7), Digital Assessment (3.9), Empowering Learners (3.6), and Facilitating learners' digital competence (3.6)—fall within B1 – Integrator (Emerging use). This indicates that while digital tools are being used in the classroom, their integration into pedagogical practices is still evolving and not yet systematic or fully effective.

Teaching and Learning: Digital tools are used to support instruction, but there is room to strengthen interactive, learner-centered, and innovative teaching approaches.



Digital Assessment: Although relatively stronger within this group, practices remain at an emerging stage, suggesting a need to enhance the use of digital tools for formative assessment, feedback, and data-driven decision-making.

Empowering Learners: Lower scores here indicate limited use of digital tools to personalize learning, foster inclusion, and support learner autonomy.

Facilitating Learners' Digital Competence: This area highlights a key gap, suggesting that learners are not yet being systematically supported in developing their own digital skills, such as critical thinking, content creation, and responsible digital behaviour.

Core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement	4.4	Functional use	B2 – Expert
Digital Resources	4.2	Functional use	B2 – Expert
Teaching and Learning	3.7	Emerging use	B1 – Integrator
Digital Assessment	3.9	Emerging use	B1 – Integrator
Empowering Learners	3.6	Emerging use	B1 – Integrator
Facilitating learners' digital competence	3.6	Emerging use	B1 – Integrator

Table 7: Mean Scores of Core Areas – Malawi

Overall Interpretation of Results

Overall, the results indicate that Malawian educators operate at a transition stage between “Digital Integrator” (B1) and “Digital Expert” (B2), demonstrating solid competence in the professional and operational use of digital technologies, alongside emerging capacity to integrate these tools into pedagogical practice. Digital technologies are widely used for communication, resource development, and professional engagement, forming a strong foundation for further pedagogical innovation. However, their application in teaching and learning processes remains partially integrated rather than fully transformative, and is not yet consistently aligned with advanced, learner-centered approaches.

At the same time, the findings reveal uneven development across competence areas, particularly in pedagogical and learner-focused domains. While Professional Engagement and Digital Resources reach functional levels (B2 – Expert), reflecting strong capacity in collaboration, use of institutional platforms, and creation and management of digital content, other areas remain at the Emerging level (B1 – Integrator). This indicates that educators are experimenting with digital pedagogies, but have not yet fully embedded them into systematic instructional design or innovative teaching strategies.



Within the Teaching and Learning domain, the combination of functional competence in collaborative and self-regulated learning with lower scores in teaching with digital technologies (3.4) and emerging technologies (3.0) suggests that while learner-centered approaches are developing, the pedagogical use of digital tools remains limited in depth and innovation. Similarly, in Digital Assessment, although educators demonstrate functional competence in assessment strategies and data analysis, the lower performance in feedback and instructional planning (3.4) indicates that digital assessment is not yet consistently used to inform personalized learning or adaptive teaching practices.

In the Empowering Learners domain, all sub-areas remain at an emerging level, highlighting that the use of digital technologies to support inclusion, differentiation, and learner autonomy is still developing. In particular, the relatively low score in blended learning (3.4) suggests that the integration of online and face-to-face learning environments is not yet fully established.

A similar pattern is observed in Facilitating Learners' Digital Competence, where strengths in information and data literacy (4.0) and problem solving (4.0) are contrasted with lower scores in communication and collaboration (3.0) and digital content creation (3.0). These findings indicate that while foundational digital skills are supported, more advanced competences—such as creative production, collaboration, and responsible digital participation—are not yet systematically integrated into teaching practices.

Conversely, several sub-areas demonstrate strong performance, particularly in organizational communication, professional collaboration, and use of digital infrastructure, with some reaching even C1 – Leader level. These strengths suggest that educators are well-positioned within digital professional ecosystems and show readiness to progress towards more reflective, innovative, and pedagogically advanced uses of technology.

Implications for Professional Development

The identification of professional development priorities for Malawi is based on the analysis of sub-core competence areas, with particular attention to those positioned at the lower range of Emerging use (B1 – Integrator). While no areas fall within the Initial (A2) level, several sub-areas reveal important gaps that require targeted strengthening to support progression towards more advanced and transformative digital pedagogical practices.



Priority Areas (Critical Gaps)

The following sub-areas represent the weakest points and should be prioritized:

- Emerging technologies (3.0) – limited awareness and pedagogical use of advanced digital tools such as AI, simulations, and virtual environments
- Learners' communication and collaboration (3.0) – insufficient integration of digital tools to foster interactive, collaborative, and networked learning
- Learners' digital content creation (3.0) – limited opportunities for students to develop creative and productive digital skills
- Teaching with digital technologies (3.4) – need to strengthen instructional design and meaningful integration of digital tools into teaching strategies
- Feedback and instructional planning (3.4) – limited use of digital assessment data to inform teaching and personalize learning
- Blended learning (3.4) – early-stage integration of online and face-to-face learning environments

Medium Priority Areas

- Sharing digital resources (3.6) – need to strengthen collaboration and engagement with open educational practices
- Differentiation and personalization (3.6) – limited use of digital tools to tailor learning to diverse learner needs
- Safety and wellbeing (3.6) – need to enhance responsible, safe, and ethical use of digital technologies
- Reflective practice and professional learning (3.8)- need for reflective practices (online self -reflection tools) and further professional learning activities to develop digital competences.
- Guidance, feedback and reflection (3.8) – feedback practices supported by digital tools are not yet fully systematic or personalized
- Accessibility and inclusion (3.8) – need to further ensure equitable access and inclusive learning environments
- Actively engaging learners (3.8) – digital tools are used to support engagement, but not consistently across contexts
- Responsible use (3.8) – need to strengthen learners' understanding of ethical and responsible digital behaviour



3.4 Mozambique

Background Information – Mozambique

The questionnaire in Mozambique was completed by nine (9) participants working in the Technical and Vocational Education and Training (TVET) sector, primarily in roles as TVET trainers or instructors, with three participants identified as a TVET practitioner (e.g., field-based trainer, technical expert, or community trainer). In terms of professional experience, the Mozambican sample reflects a well-balanced distribution across experience levels, with a notable concentration in the mid-to-high experience range: 3 participants (33%) have 1–3 years of experience, all of whom are practitioners; 3 participants (33%) have 4–7 years of experience; 2 participants (22%) have 8–15 years of experience ;1 participant (11%) has more than 15 years of experience Overall, the Mozambican group is characterized by a strong presence of experienced VET trainers, combined with a smaller but relevant group of early-career practitioners

Analysis of Competence Sub-Core Areas

Table 8 reports the mean scores for the DigCompEdu competence sub-areas, providing insight into Mozambique educators perceived levels of digital pedagogical competence and their integration of digital technologies in professional practice

Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement				
PE1	Organizational communication	4.1	Functional use	B2 – Expert
PE2	Online learning environments	4.0	Functional use	B2 – Expert
PE3	Professional collaboration	4.4	Functional use	B2 – Expert
PE4	Digital technologies & infrastructure	4.2	Functional use	B2 – Expert
PE5	Reflective practice	4.1	Functional use	B2 – Expert
PE6	Digital life	4.5	Functional use	B2 – Expert
PE7	Professional learning (through digital tech)	4.5	Functional use	B2 – Expert



Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
PE8	Professional learning (about digital tech)	4.2	Functional use	B2 – Expert
Digital Resources				
DR1	Searching and selecting resources	4.2	Functional use	B2 – Expert
DR2	Creating digital resources	3.8	Emerging use	B1 – Integrator
DR3	Modifying digital resources	4.1	Functional use	B2 – Expert
DR4	Managing digital content	4.0	Functional use	B2 – Expert
DR5	Sharing digital resources	4.2	Functional use	B2 – Expert
Teaching and Learning				
TL1	Teaching with digital technologies	4.1	Functional use	B2 – Expert
TL2	Guidance, feedback & reflection	4.2	Functional use	B2 – Expert
TL3	Collaborative learning	4.7	Functional use	B2 – Expert
TL4	Self-regulated learning	4.3	Functional use	B2 – Expert
TL5	Emerging technologies	3.5	Emerging use	B1 – Integrator
Digital Assessment				
AS1	Assessment strategies	4.2	Functional use	B2 – Expert
AS2	Analyzing learning data	4.2	Functional use	B2 – Expert
AS3	Feedback and planning	4.2	Functional use	B2 – Expert
Empowering Learners				
EL1	Accessibility and inclusion	3.1	Emerging use	B1 – Integrator
EL2	Differentiation & personalization	4.0	Functional use	B2 – Expert
EL3	Actively engaging learners	4.1	Functional use	B2 – Expert
EL4	Blended learning	4.5	Functional use	B2 – Expert
Facilitating Learners' Digital Competence				
FLDC1	Information & data literacy	3.9	Emerging use	B1 – Integrator
FLDC2	Communication & collaboration	3.8	Emerging use	B1 – Integrator
FLDC3	Digital content creation	3.3	Emerging use	B1 – Integrator



Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
FLDC4	Safety & wellbeing	3.5	Emerging use	B1 – Integrator
FLDC5	Responsible use	4.7	Functional use	B2 – Expert
FLDC6	Problem solving	4.3	Functional use	B2 – Expert

Table 8 : Mean score of Sub-Core Areas/Mozambique

Professional Engagement

Results indicate strong functional digital competence (B2 – Expert) across all sub-areas. High scores in professional collaboration (4.4), digital life (4.5), and professional learning through digital technologies (4.5) highlight educators' active engagement in digital professional environments. Similarly, solid performance in infrastructure use (4.2), and Professional learning (about digital tech) – (4.2) confirms confident and consistent use of digital tools. Managing online learning environments while considering ethics, privacy, access policies, and responsible data management (4), Using digital technologies to enhance communication with colleagues and/or learners (and, where relevant, parents or community members) and (4.1) and Reflective practice through the use of digital technologies (e.g. online self-reflection tools, digital reflection diaries, peer-to-peer reflection) (4.1), while close to functional level, suggests that deeper critical reflection on digital practices could be further strengthened.

Digital Resources

The Digital Resources domain in Mozambique reflects overall functional competence (B2 – Expert), indicating that educators are generally confident in sourcing, adapting, and managing digital materials to support teaching and learning. Educators demonstrate strong capacity in searching and selecting digital resources (4.2), suggesting effective use of search strategies such as keywords, filters, and online repositories to identify relevant materials. This indicates that digital resources are being purposefully integrated into teaching practices. Sharing digital resources (4.2) also shows positive progress, reflecting an emerging but growing engagement with collaborative practices and respect for intellectual property, such as proper citation and linking to original sources. Similarly, modifying digital resources (4.1) is well developed, showing that educators are able to adapt existing materials—such as editing presentations or enriching content with multimedia—while demonstrating awareness of copyright and licensing requirements. In addition, managing digital content (4.0) is at a solid functional level, indicating that educators can organize and store materials in a structured and secure way, ensuring accessibility while protecting sensitive data. However, creating digital resources (3.8 – B1 Integrator) remains comparatively lower, highlighting that while educators can effectively use and adapt existing materials, their ability to design and produce original digital content (e.g. videos, interactive materials, or multimedia resources) is still developing. This



suggests a need for further support in content creation pedagogical design, and the use of advanced authoring tools.

skills,

Teaching and Learning

The Teaching and Learning domain in Mozambique reflects overall functional competence (B2 – Expert), indicating that educators are confidently integrating digital technologies into their pedagogical practices, particularly to support learner engagement and autonomy. Strong performance in collaborative learning (4.7) highlights educators' ability to effectively use digital tools to foster interaction, peer learning, and group-based activities. This suggests a clear shift towards learner-centered approaches, where technology supports both individual and collective knowledge construction. Similarly, self-regulated learning (4.3) demonstrates that educators are successfully using digital technologies to promote learner autonomy, responsibility, and active participation. Tools such as online platforms, self-assessment activities, and digital portfolios are likely supporting students in managing their own learning processes. Teaching with digital technologies (4.1) also reflects a solid level of competence, indicating regular use of digital tools (e.g., online resources, apps, and learning platforms) to support instruction. In the same vein, guidance, feedback, and reflection (4.2) show that digital tools are being used to support feedback processes, but there is still room to enhance continuous, personalized, and data-informed feedback practices. The main area for improvement is emerging technologies (3.5 – B1 Integrator), which remains at an emerging level. This indicates limited integration of advanced tools such as AI, virtual reality, or simulations, as well as a need to further develop understanding of their ethical and pedagogical use.

Digital Assessment

Digital Assessment appears as a well-developed area, with all sub-areas at functional level (4.2). Educators demonstrate confidence in using digital tools for assessment, data analysis, and planning. Nonetheless, the functional interpretation suggests that further development is needed in using assessment data strategically to personalize learning.

Empowering Learners

The Empowering Learners domain in Mozambique reflects overall functional competence (B2 – Expert), indicating that educators are increasingly using digital technologies to support learner-centered, flexible, and engaging learning environments. Strong performance in blended learning (4.5) highlights educators' ability to effectively combine face-to-face and online learning, using digital platforms to extend learning beyond the classroom. This suggests a growing capacity to ensure continuity, flexibility, and access



to learning opportunities. Similarly, actively engaging learners (4.1) demonstrates that digital tools are being used to promote participation, creativity, and interaction, supporting more dynamic and motivating learning experiences. Differentiation and personalization (4.0) is also at a functional level, indicating that educators are using digital technologies to accommodate diverse learning needs, allowing for different learning pathways, paces, and levels of support. However, accessibility and inclusion (3.1 – B1 Integrator) remains the weakest area within this domain. This suggests that while digital tools are being used to support learning, there are still challenges in ensuring equitable access for all learners, particularly those facing contextual, physical, or cognitive barriers (e.g., limited connectivity, lack of devices, or special educational needs).

Facilitating Learners' Digital Competence

The Facilitating Learners' Digital Competence domain in Mozambique reflects a predominantly emerging competence level (B1 – Integrator), with some areas reaching functional use. This indicates that educators are actively integrating digital competence into learning activities, but practices are still developing in terms of consistency and depth. Educators show relatively stronger performance in responsible use (4.7) and problem solving (4.3), both at a functional level. This suggests that learners are being supported in developing ethical awareness, digital responsibility, and the ability to use technology creatively to address problems, including aspects of innovation and critical thinking. However, most sub-areas remain at the emerging level, indicating partial integration. Information and data literacy (3.9) shows that learners are increasingly engaged in activities involving searching, evaluating, and managing digital information, though these practices may not yet be systematically embedded. Similarly, communication and collaboration (3.8) suggest that while digital tools are used for interaction, there is still room to strengthen structured, collaborative learning aligned with digital norms and inclusivity. Lower scores in digital content creation (3.3) highlight a key gap, indicating that learners have limited opportunities to create and modify digital artefacts, such as multimedia content or digital projects. This points to a need for more creative and production-oriented learning activities. In addition, safety and wellbeing (3.5) remains at an emerging level, suggesting that while some attention is given to safe technology use, more systematic efforts are needed to address online risks, digital wellbeing, and responsible behaviour in digital environments.

Core-Level Analysis of Digital Pedagogical Competence

The mean scores across the DigCompEdu core competence areas indicate that educators in Mozambique demonstrate generally strong levels of digital pedagogical competence, with most domains positioned within the Functional use (B2 – Expert) band and some remaining at the Emerging (B1 – Integrator) level. This suggests that digital



technologies are being confidently integrated into professional practice, although some pedagogical and learner-focused dimensions require further development.

The strongest performance is observed in Professional Engagement (mean = 4.2), reflecting educators' ability to use digital technologies effectively for communication, collaboration, and professional learning. This indicates a well-established presence in digital professional environments and ongoing engagement with technology-supported development.

Similarly, Teaching and Learning (mean = 4.2) and Digital Assessment (mean = 4.2) demonstrate solid competence, suggesting that educators are using digital tools to support instructional practices, learner interaction, and assessment processes. However, their interpretation at the emerging boundary indicates that further development is needed to strengthen systematic pedagogical integration, feedback practices, and innovative use of digital tools.

Digital Resources (mean = 4.0) also reflects functional competence, showing that educators are capable of searching, creating, adapting, and managing digital content to support teaching. This suggests purposeful use of digital materials, although there may still be room to enhance more advanced practices such as collaborative sharing and content creation.

In contrast, Empowering Learners (mean = 3.9) and Facilitating learners' digital competence (mean = 3.9) remain within the Emerging competence band. These results indicate that while digital technologies are used to support learner engagement and participation, their role in fostering inclusive, personalized learning and the systematic development of learners' digital skills is still evolving.

Core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement	4.2	Functional use	B2 – Expert
Digital Resources	4.0	Functional use	B2 – Expert
Teaching and Learning	4.2	Functional use	B2 – Expert
Digital Assessment	4.2	Functional use	B2 – Expert
Empowering Learners	3.9	Emerging use	B1 – Integrator
Facilitating learners' digital competence	3.9	Emerging use	B1 – Integrator

Overall Interpretation of Results

The analysis of both sub-areas and core competence areas indicates that educators in Mozambique demonstrate overall functional digital pedagogical competence (B2 –



Expert), with several areas still positioned at the emerging level (B1 – Integrator). This suggests that digital technologies are confidently and purposefully used across professional and teaching practices, although deeper pedagogical integration and learner-focused innovation remain under development.

At the sub-area level, the strongest performance is observed in Professional Engagement, where all indicators fall within the functional level. High scores in professional collaboration (4.4), digital life (4.5), and continuous professional learning (4.5) highlight educators' strong engagement in digital professional environments, communication, and ongoing development. This confirms that educators are well-positioned within digitally supported institutional ecosystems.

Similarly, Digital Resources shows solid functional competence across most sub-areas, particularly in searching, modifying, managing, and sharing content. However, creating digital resources (3.8 – B1) remains slightly lower, indicating that while educators are effective users and adapters of digital materials, their capacity as content creators and designers is still developing.

In the Teaching and Learning domain, educators demonstrate strong performance in collaborative learning (4.7) and self-regulated learning (4.3), reflecting effective use of digital tools to support learner interaction and autonomy. However, teaching with digital technologies and feedback practices, although close to functional level, are still interpreted as emerging, suggesting a need for more systematic instructional design and personalized learning approaches. The lowest sub-area, emerging technologies (3.5 – B1), indicates limited integration of innovative tools such as AI or simulations.

Digital Assessment appears as a consistently strong domain, with all sub-areas at functional level (4.2), indicating that educators are confident in using digital tools for assessment, data analysis, and planning, although further development could enhance data-driven and adaptive teaching practices.

In Empowering Learners, most sub-areas reach functional level, particularly blended learning (4.5) and learner engagement (4.1), suggesting effective use of digital tools to support flexible and interactive learning environments. However, accessibility and inclusion (3.1 – B1) remains a clear gap, highlighting challenges in ensuring equitable access and inclusive digital education.

The weakest domain overall is Facilitating Learners' Digital Competence, where most sub-areas remain at the emerging level. While educators support responsible use (4.7) and problem solving (4.3) effectively, lower scores in digital content creation (3.3), safety and wellbeing (3.5), and communication and collaboration (3.8) indicate that learners are not yet systematically supported in developing advanced, creative, and critical digital skills.



Implications for Professional Development

The identification of professional development priorities for Mozambique is based on the analysis of sub-core competence areas, with a focus on those positioned at the lower range of Emerging use (B1 – Integrator). While Mozambique demonstrates a strong and consistent B2 – Expert profile across most domains, several specific gaps remain that require targeted intervention to ensure balanced and comprehensive competence development.

Priority Areas (Critical Gaps)

These represent the most urgent areas requiring targeted intervention:

- Accessibility and inclusion (3.1) – limited capacity to ensure equitable and inclusive access to digital learning for all learners
- Digital content creation (learners' competence) (3.3) – insufficient development of learners' creative and production-oriented digital skills

Medium Priority Areas (Emerging Competence)

These areas are developing but require further strengthening:

- Emerging technologies in teaching (3.5) – limited integration of innovative tools (e.g. AI, simulations) and their pedagogical application
- Safety and wellbeing (3.5) – emerging focus on safe and responsible digital use, not yet systematically embedded in teaching practices
- Communication and collaboration (learners' competence) (3.8) – moderate support for learners' digital interaction skills, requiring more structured approaches
- Creating digital resources (3.8) – educators may benefit from further support in designing more advanced and interactive digital materials

3.5 Nigeria



Background Information

The questionnaire was completed by six VET participants representing a diverse range of professional experience within the TVET sector. Early-career professionals with 1–3 years of experience accounted for 33.3% of the sample, while another 33.3% consisted of highly experienced trainers and practitioners with more than 15 years of professional practice. Mid-career participants were also represented, with 16.7% reporting 4–7 years of experience and 16.7% indicating 8–15 years of experience. This distribution demonstrates a balanced mix of emerging and experienced TVET professionals, enabling the study to capture diverse perspectives on digital competence development across different career stages.

Analysis of Competence Sub-Core Areas

Table 10 reports the mean scores for the DigCompEdu competence sub-areas, providing insight into Nigerian educators' perceived levels of digital pedagogical competence and their integration of digital technologies in professional practice.

Sub-core code	Sub-core Areas	Mean Score	Interpretation Band	DigCompEdu Level
	Professional Engagement			
PE1	Organizational communication	5.7	Advanced use	C1 – Leader
PE2	Online learning environments (data management & ethics)	5.3	Advanced use	C1 – Leader
PE3	Professional collaboration	5.7	Advanced use	C1 – Leader
PE4	Digital technologies & institutional infrastructure	5.0	Advanced use	C1 – Leader
PE5	Reflective practice	5.2	Advanced use	C1 – Leader
PE6	Digital life	5.5	Advanced use	C1 – Leader
PE7	Professional learning (through digital technologies)	5.5	Advanced use	C1 – Leader
PE8	Professional learning (about digital technologies)	5.2	Advanced use	C1 – Leader
	Digital Resources			
DR1	Searching and selecting digital resources	5.3	Advanced use	C1 – Leader
DR2	Creating digital resources	5.8	Advanced use	C1 – Leader
DR3	Modifying digital resources (copyright and licensing)	5.7	Advanced use	C1 – Leader



DR4	Managing and protecting digital content	5.5	Advanced use	C1 – Leader
DR5	Sharing digital resources	6.1	Transformative use	C2 – Pioneer
	Teaching and Learning			
TL1	Teaching with digital technologies	5.0	Advanced use	C1 – Leader
TL2	Guidance, feedback and reflection	5.7	Advanced use	C1 – Leader
TL3	Collaborative learning	5.3	Advanced use	C1 – Leader
TL4	Self-regulated learning	5.2	Advanced use	C1 – Leader
TL5	TL5 Emerging technologies (Ethical use)	5.0	Advanced use	C1 – Leader
	Digital Assessment			
DA1	Assessing strategies	5.2	Advanced use	C1 – Leader
DA2	Analyzing evidence (learning data)	5.2	Advanced use	C1 – Leader
DA3	Feedback and planning	6.0	Transformative use	C2 – Pioneer
	Empowering Learners			
EL1	Accessibility and Inclusion	4.8	Functional use	B2 – Expert
EL2	Differentiation and personalization	4.8	Functional use	B2 – Expert
EL3	Actively engaging learners	5.5	Advanced use	C1 – Leader
EL4	Blended learning	5.8	Advanced use	C1 – Leader
	Facilitating learners' digital competence			
FLDC1	Information and data literacy	4.8	Functional use	B2 – Expert
FLDC2	Communication and collaboration	5.2	Advanced use	C1 – Leader
FLDC3	Content Creation	4.2	Functional use	B2 – Expert
FLDC4	Safety and wellbeing	4.2	Functional use	B2 – Expert
FLDC5	Responsive use	5.0	Advanced use	C1 – Leader
FLDC6	Problem solving	4.7	Functional use	B2 – Expert

Table 10: Mean score of Sub-Core Areas/Nigeria

Professional Engagement

All sub-areas under Professional Engagement fall within Advanced use (mean scores between 5.00 and 5.7). High scores in organizational communication (5.7) and professional collaboration (5.7) indicate that educators actively use digital technologies to communicate and cooperate with colleagues and learners and interact with other education or training stakeholders. Similarly, strong performance in digital professional



learning suggests a culture of continuous professional development supported by digital tools.

development

Digital Resources

This domain emerges as one of the strongest areas of competence. Sharing digital resources records the highest mean score (6.2), indicating that educators are pioneers in engaging in responsible and collaborative knowledge-sharing practices while respecting intellectual property and copyright requirements. Educators also demonstrate advanced capability in creating digital resources (5.8), including multimedia materials such as texts, images, audio, and video, as well as in modifying existing resources (5.7) to better support teaching and learning objectives while complying with copyright and licensing rules.

Teaching and Learning

All teaching-related sub-areas are rated at the Advanced use level, indicating confident and purposeful integration of digital technologies into instructional practices. Particularly strong performance in guidance, feedback and reflection (5.7) shows that educators effectively use digital tools to provide timely feedback and create opportunities for learners to reflect on their progress, thereby informing adjustments to both teaching strategies and learning approaches. Similarly, high scores in collaborative learning (5.3) suggest that digital technologies are actively employed to foster interaction, teamwork, and shared knowledge construction, supporting both individual and collective learning outcomes. Overall, these results highlight educators' capacity to design digitally enriched learning environments that promote engagement, participation, and continuous pedagogical improvement.

Digital Assessment

Digital assessment practices appear to be well established. While both assessment strategies (5.17) and analyzing evidence through learning data (5.2) are positioned at the Advanced use level, feedback and planning records a higher mean score (6.00), reaching the Transformative use band. This indicates that educators are pioneers in using digital technologies to support both formative and summative assessment processes, as well as to collect and analyze evidence on learners' progress and outcomes. The particularly strong performance in digital feedback suggests that educators are increasingly leveraging technology to provide timely, personalized guidance and to inform the planning of subsequent teaching and learning actions. Overall, these results reflect a growing



capacity for data-informed instructional decision-making and the strategic use of digital assessment to enhance learner achievement.

Empowering Learners

The Empowering Learners domain in Nigeria reflects strong competence overall, combining functional (B2 – Expert) and advanced (C1 – Leader) levels. This indicates that educators are not only integrating digital technologies effectively but are also advancing towards more strategic and innovative learner-centered practices. High performance in actively engaging learners (5.5) and blended learning (5.8) demonstrates that educators are using digital tools to create highly interactive, flexible, and motivating learning environments. The strong score in blended learning suggests well-developed capacity to integrate online and face-to-face instruction, ensuring continuity and expanded access to learning. At the same time, accessibility and inclusion (4.8) and differentiation and personalization (4.8) at functional level indicate that educators are effectively using digital technologies to support diverse learner needs and provide adaptable learning pathways. However, these practices may not yet be fully optimized or systematically embedded at a strategic level.

Facilitating Learners' Digital Competence

The lowest scores are observed in this domain, highlighting a key developmental area. Sub-areas such as content creation (4.2) and safety and wellbeing (4.2) remain at the Functional level, indicating that educators may require further support in guiding learners to develop higher-order digital competences. Similarly, problem solving (4.7) and information literacy (4.8) suggest moderate but not yet advanced facilitation capacity. Nevertheless, stronger performance in communication and collaboration (5.2) and responsive use of digital technologies (5.0) shows that educators are beginning to support learners in interactive and responsible use of technologies.

Core-Level Analysis of Digital Pedagogical Competence

The mean scores across the core competence areas indicate that educators demonstrate generally high levels of digital pedagogical competence, with most domains positioned within the Advanced use interpretation band (C1 – Leader level). The strongest performance is observed in Digital Resources (5.70), suggesting that educators are



particularly confident in creating, adapting, managing, and sharing digital learning materials to support instructional objectives.

Similarly, Digital Assessment (5.45) and Professional Engagement (5.38) reflect well-established integration of digital technologies in professional collaboration, communication, and data-informed teaching practices. Teaching and Learning (5.23) and Empowering Learners (5.25) also show advanced levels of competence, indicating purposeful use of digital tools to support learner participation, feedback processes, and flexible learning approaches.

In contrast, facilitating learners' digital competence records a lower mean score (4.67), positioned at the Functional use level (B2 – Expert). This suggests that while educators are effective users of digital technologies in their own practice, they are comparatively less confident in systematically supporting learners' development of independent digital skills, such as digital problem solving, content creation, and online safety.

Core Areas	Mean Score	Interpretation Band	DigCompEdu Level
Professional Engagement	5.38	Advanced use	C1 – Leader
Digital Resources	5.70	Advanced use	C1 – Leader
Teaching and Learning	5.23	Advanced use	C1 – Leader
Digital Assessment	5.45	Advanced use	C1 – Leader
Empowering Learners	5.25	Advanced use	C1 – Leader
Facilitating learners' digital competence	4.67	Functional use	B2 – Expert

Table 11: mean score of core areas - Nigeria

Overall Interpretation of Results

Overall, the results indicate that Nigerian educators operate at a highly advanced level of digital competence, predominantly within the “Digital Leader” (C1) category, with some areas reaching “Pioneer” (C2) level. This reflects a well-established and mature integration of digital technologies across professional engagement, resource development, teaching, and assessment practices. Digital tools are not only widely used, but are also strategically embedded in pedagogical processes, supporting innovation, collaboration, and data-informed decision-making.

The findings show consistently high performance across all core domains, particularly in Digital Resources, Teaching and Learning, and Digital Assessment, where educators demonstrate strong capacity to design, implement, and evaluate digitally enriched learning experiences. Notably, areas such as sharing digital resources (6.1) and feedback



and instructional planning (6.0) reach transformative levels (C2 – Pioneer), indicating that digital technologies are being used to enhance collaboration, personalise learning, and continuously improve teaching practices based on evidence.

In the domain of Professional Engagement, all sub-areas are positioned at advanced levels, highlighting educators' strong participation in digital professional ecosystems, effective use of institutional infrastructure, and ongoing engagement in professional learning through and about digital technologies. This suggests a high level of digital confidence, autonomy, and reflective practice among educators.

At the same time, a small number of areas remain at the Functional level (B2 – Expert), particularly within Empowering Learners and Facilitating Learners' Digital Competence. These include accessibility and inclusion (4.8), differentiation and personalization (4.8), information and data literacy (4.8), problem solving (4.7), as well as digital content creation (4.2) and safety and wellbeing (4.2). While these scores still reflect strong competence, they indicate that learner-centered dimensions, especially those related to digital content creation and responsible digital participation, are slightly less developed compared to other domains.

Implications for Professional Development

The identification of professional development priorities for Nigeria is based on the analysis of sub-core competence areas, with emphasis on those performing below the overall Advanced (C1 – Leader) level. The results indicate a highly advanced and well-established digital competence profile, with several areas even reaching Transformative use (C2 – Pioneer). As such, no critical gaps are identified.

Medium Priority Areas

The following sub-areas, while demonstrating Functional competence (B2 – Expert), represent opportunities for further development towards advanced and transformative levels:

Learners' digital content creation (4.2) – need to further strengthen learners' ability to produce creative, complex, and innovative digital artefacts

Safety and wellbeing (4.2) – require deeper integration of digital safety, ethics, and wellbeing across teaching and learning processes



Additional areas at the functional level that would benefit from further enhancement include:

Problem solving (4.7) – expanding the use of digital technologies to support complex, real-world problem-solving

Accessibility and inclusion (4.8) – strengthening inclusive digital practices to better address diverse learner needs

Differentiation and personalization (4.8) – enhancing adaptive and personalized learning pathways

Information and data literacy (4.8) – promoting more advanced and critical use of digital information

4. Comparative Analysis of the SSA Countries Involved

The comparative results show different levels of digital pedagogical maturity across the five countries, ranging from early-stage development (Ethiopia) to advanced and innovation-oriented systems (Nigeria and Madagascar), with Malawi and Mozambique positioned in intermediate stages.

1. Ethiopia – Foundational Stage with Systemic Gaps

Ethiopia presents the most critical and widespread gaps across all domains. Key weaknesses include digital assessment, learner digital content creation, safety and wellbeing, and core pedagogical practices such as teaching with digital technologies and self-regulated learning. Additionally, areas such as blended learning, emerging technologies, inclusion, and personalization remain underdeveloped.

This indicates a system where digital technologies are not yet effectively embedded in teaching and learning, requiring comprehensive capacity-building across all dimensions, from basic pedagogical integration to learner competence development.

2. Malawi – Developing Pedagogical Integration

Malawi shows a transition profile, with fewer but still significant gaps concentrated in pedagogical and learner-centered areas. Critical issues include emerging technologies, learner collaboration, and digital content creation, alongside challenges in instructional design, provision of feedback, and blended learning.



Medium-level gaps in sharing digital resources, guidance, inclusion, engagement, safety, and personalization further indicate that while digital tools are being used, their systematic and impactful integration into teaching practices is still evolving.

3. Mozambique – Strong Foundation with Targeted Gaps

Mozambique presents a more advanced and balanced profile, with only a few critical gaps, notably in accessibility and inclusion and learners' digital content creation. Most other areas fall within medium priority, including emerging technologies, safety and wellbeing, collaborative learning competences and the creation of digital resources.

This suggests that digital technologies are well integrated at an operational level, but further efforts are needed to strengthen inclusivity, learner creativity, and advanced pedagogical innovation.

4. Madagascar – Advanced with Minor Gaps

Madagascar shows a high level of digital competence, with no critical gaps identified. Only a few medium priority areas remain, specifically safety and wellbeing and learners' digital content creation.

This indicates that digital technologies are effectively and consistently embedded in teaching and learning, with the remaining challenge focused on enhancing learner autonomy, creativity, and responsible digital participation.

5. Nigeria – Highly Advanced and Innovation-Oriented

Nigeria demonstrates the most advanced profile, with no critical gaps and only minor areas for further development. Medium priorities include learners' digital content creation and safety and wellbeing.

The system reflects mature and strategic use of digital technologies, with strong potential for innovation, leadership, and scaling of best practices.

5. Cross-Country Comparison

Taken together, the countries can be grouped into three broad clusters:

High-performing countries:

Madagascar and Nigeria demonstrate the most advanced digital competence profiles. Their educators are already using digital technologies strategically and collaboratively, but both still need to strengthen learners' digital competence, especially in content creation and digital safety.

Middle-performing countries:



Mozambique and Malawi show developing but stable digital competence. Mozambique is slightly stronger overall, particularly in professional engagement and assessment, while Malawi shows more uneven performance across domains. In both cases, weaker areas are concentrated in learner empowerment, inclusive digital pedagogy, and facilitating learners' own digital skills.

Lower-performing country:

Ethiopia remains at an earlier stage of digital integration, with serious weaknesses in digital assessment, creative learner digital activities, and safe digital participation. It requires broader foundational capacity building than the other countries.

6. Interpretive Summary of the Low Scores

The table below provides a comparative overview of the participating countries, highlighting the lowest-performing sub-core competence areas identified through the analysis, alongside indicative capacity-building topics. The purpose of this table is to translate the assessment findings into practical and targeted professional development priorities, tailored to the specific needs and maturity levels of each SSA country.

By focusing on the weakest areas—particularly those within the Initial (A2) and lower Emerging (B1) levels, as well as relative gaps in higher-performing systems (Madagascar and Nigeria)—the table supports a differentiated approach to capacity building. It illustrates how countries at different stages of digital competence development require distinct types of interventions, ranging from foundational skill-building to advanced pedagogical innovation and leadership.

Country	Lowest Sub-Core Areas	Indicative Capacity Building Topics
Ethiopia	• Digital content creation (2.3) • Digital assessment (2.7) • Safety & wellbeing (2.7) • Emerging technologies (3.0) • Blended learning (3.0) • Responsible use & problem solving (3.2) • Accessibility & inclusion (3.2)	• Designing and Producing Engaging Digital Learning Content (Multimedia, Interactive Tools & OER). • Designing and using digital assessment tools (formative assessment, feedback systems) • Digital safety, online ethics, and wellbeing education. • Introduction to emerging technologies (AI, VR, simulations). • Blended and hybrid learning design. • Fostering Responsible Digital Use and Problem-Solving Skills in Learners.



Country	Lowest Sub-Core Areas	Indicative Capacity Building Topics
	•Differentiation & personalization (3.2) •Teaching with digital technologies (3.3) •Self-regulated learning (3.3) •Information & data literacy (3.3)	•Inclusive Digital Education: Accessibility, Universal Design for Learning (UDL) and Equity •Personalized Learning Pathways Using Digital Technologies. • Pedagogically Effective Use of Digital Technologies in Teaching and Learning. •Supporting Self-Regulated Learning through Digital Tools and Strategies. •Developing Learners' Information and Data Literacy in the Digital Age.
Malawi	•Emerging technologies (3.0) •Learners' communication & collaboration (3.0) •Digital content creation (3.0) •Teaching with digital technologies (3.4) •Feedback & planning (3.4) • Blended learning (3.4) • Sharing digital resources (3.6) •Differentiation& personalization (3.6) • Safety & wellbeing (3.6) •Guidance & reflection (3.8) •Accessibility and inclusion (3.8) •Actively engaging learners (3.8) •Responsible use (3.8)	•Introduction to emerging technologies (AI, VR, simulations). •Enhancing Collaborative and Networked Learning through Digital Communication Tools •Designing and Producing Engaging Digital Learning Content (Multimedia, Interactive Tools & OER). •Pedagogically Effective Use of Digital Technologies in Teaching and Learning. •Using Digital Assessment Data to Inform Teaching, Feedback. •Blended and hybrid learning design. •Open Educational Practices: Sharing, Adapting, and Reusing Digital Resources. •Personalized Learning Pathways Using Digital Technologies •Digital safety, online ethics, and wellbeing education. •Enhancing Feedback and Reflective Practices through Digital Technologies for Adaptive Teaching and Learning. •Inclusive Digital Education: Accessibility, Universal Design for Learning (UDL) and Equity. •Increasing Learner Engagement through Interactive and Participatory Digital Pedagogies. •Fostering Ethical, Responsible, and Critical Digital Citizenship among Learners.



Country	Lowest Areas	Sub-Core	Indicative Capacity Building Topics
Mozambique	•Accessibility inclusion (3.1) •Learners' digital content creation (3.3) •Emerging technologies (3.5) • Safety & wellbeing (3.5) •Communication & collaboration (3.8) •Creating digital resources (3.8)	&	•Inclusive Digital Education: Accessibility, Universal Design for Learning (UDL) and Equity •Designing and Producing Engaging Digital Learning Content (Multimedia, Interactive Tools & OER). •Introduction to emerging technologies (AI, VR, simulations). •Digital safety, online ethics, and wellbeing education. •Designing Digital Collaborative Learning: Fostering Communication, Inclusion, and Respectful Online Interaction. •Designing and Creating Effective Digital Learning Resources: Multimedia Tools for Teaching and Learning.
Madagascar	• Safety & wellbeing (3.8) •Learners' digital content creation (4.0)		•Digital safety, online ethics, and wellbeing education •Designing and Producing Engaging Digital Learning Content (Multimedia, Interactive Tools & OER)
Nigeria	• Safety & wellbeing (4.2) •Learners' digital content creation (4.2)		•Digital safety, online ethics, and wellbeing education •Designing and Producing Engaging Digital Learning Content (Multimedia, Interactive Tools & OER).

Table 12: Lowest Core Areas by SSA Country

B. Digital Repository of Open Educational Resources and Best Practices in VET

Introduction

The ongoing digital and green transitions are reshaping the landscape of education and training across Europe, placing new demands on Vocational Education and Training



(VET) systems to become more flexible, inclusive, and responsive to rapidly evolving labour-market needs. In this context, the integration of digital technologies into teaching and learning processes is no longer optional but essential. VET providers are increasingly required to adopt innovative pedagogical approaches, enhance digital competences among learners and trainers, and ensure that training provision remains relevant, accessible, and future-oriented.

Against this backdrop, the development of a digital repository of Open Educational Resources (OER) and best practices constitutes a key strategic output of the project. The repository is envisaged as a structured, user-friendly, and accessible platform that brings together high-quality learning materials, digital tools, and exemplary practices from different European contexts. Its purpose is not only to facilitate access to educational content, but also to support the effective integration of technology into VET instruction across both school-based settings and work-based learning environments, including apprenticeships, continuing vocational training, and lifelong learning pathways.

At the core of this initiative lies the concept of Open Educational Resources (OER). According to UNESCO, OER are defined as “learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others.” This definition highlights not only the accessibility of such resources, but also their adaptability and potential for reuse, which are particularly important in vocational education contexts where training needs often vary across sectors, regions, and learner profiles.

OER have gained increasing recognition as a powerful enabler of educational innovation and equity. By removing cost barriers and allowing educators to adapt materials to local needs, they contribute to more inclusive learning environments and support lifelong learning opportunities. In VET, where practical relevance and up-to-date content are crucial, OER offer the flexibility to continuously update training materials, incorporate emerging technologies, and respond to new occupational standards. Furthermore, OER foster collaboration among institutions, educators, and stakeholders, encouraging the co-creation and sharing of knowledge at local, national, and international levels.

Complementing the concept of OER is the notion of best practices, which plays an equally important role in the development of the digital repository. In the context of VET, best practices can be understood as proven, effective, and innovative approaches or initiatives that demonstrate measurable success in achieving learning objectives and can be transferred or adapted to different educational contexts. Best practices provide insight into how these resources are implemented in real settings, illustrating pedagogical strategies, digital solutions, and organizational models that lead to positive outcomes.

Best practices are particularly valuable because they: demonstrate how digital tools and resources can be effectively integrated into teaching and learning processes; provide evidence of impact, such as improved learner engagement, skills development, and employability; address specific challenges, including digital skills gaps, inclusion, and the



alignment of training with labour-market demands; offer scalable and adaptable models that can be replicated in different sectors, institutions, and countries.

In this sense, OER and best practices are complementary: while OER provide the content and tools, best practices illustrate the methods and conditions for successful implementation.

Both the OER and the Best Practice were analyzed using a pedagogical and technological framework, focusing on:

OER- Areas Analyzed:

- Overview and purpose
- Digital tools and technologies used
- Pedagogical approach
- Relevance for VET contexts
- Learning objectives

Best Practice – Areas Analysed:

- Overview, purpose, and impact
- Learning context and digital solution
- Evidence of success and lessons learned
- Transferability and scalability

The purpose of this report is therefore to present and analyze selected OERs and best practices from Bulgaria, Greece, Italy, Spain, Ethiopia, Madagascar, Malawi, Mozambique and Nigeria highlighting their relevance for the development of the digital repository. These countries offer diverse yet complementary examples of innovation in VET, ranging from interactive e-learning platforms and simulation-based learning environments to national curriculum repositories and advanced digital laboratories aligned with Industry 4.0.

By examining these examples, the report aims to identify innovative approaches, and transferable models that can inform the design of a repository that is not only comprehensive but also practical and user-oriented. Ultimately, the repository is expected to function as a dynamic knowledge hub, supporting educators, trainers, learners, and policymakers in adopting and implementing effective digital practices in VET.

Bulgaria – Open Educational Resources and Best Practices in VET

OER: AGRO-INSURE E-Courses



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Overview and Purpose

The [AGRO-INSURE Training platform](#) provides an online training catalogue of e-Course Modules designed to support learners in topics related to sustainable agriculture, risk management, and innovative farming practices. These modules are offered as Open Educational Resources (OERs), meaning they are freely accessible, adaptable, and distributable by educators and training organizations with appropriate attribution, underlining the project's commitment to openness, collaboration, and knowledge sharing. The Navigation Guide itself is a short introductory that explains these foundational aspects of the platform. It reinforces that all content is provided under an open license and clarifies users' rights and expectations when using the materials. The AGRO-INSURE platform integrates H5P to enhance how learning materials are presented and interacted with. H5P is an open-source content framework (Richer HTML5 Package) used in online learning systems to create interactive and engaging content such as quizzes, presentations, interactive videos, and branching scenarios that can run seamlessly in web browsers without additional plugins. On the AGRO-INSURE platform, this means that each e-Course module in the AGRO-INSURE e-Course Modules catalogue is built or supplemented using H5P content types.



source: [Agro-Insure e-Course](#)

H5P of AGRO-INSURE OER supports the following content type:

1. Interactive Presentations - multimedia slides that may include clickable tasks, embedded media, and quizzes woven into the narrative flow.
2. Quizzes and Tests: Self-assessment tools like multiple-choice, true/false, fill-in-the-blank, and interactive question sets that provide feedback and promote retention.
3. Branching Scenarios and Games: Learning experiences where learners make choices and see outcomes, encouraging decision-making and applied understanding.

Using H5P, the modules are not just static documents but rich learning experiences that adapt to learners' actions, provide immediate feedback, and combine text, visuals, audio, and interactive elements in a responsive format suitable for desktops and mobile devices. This interactive presentation enhances adult learning by:

1. Encouraging active participation rather than passive reading.
2. Supporting self-paced learning, so users can revisit and repeat interactions as needed.
3. Allowing feedback loops within activities to reinforce correct understanding.



4. Providing an engaging blend of multimedia and tools suited for diverse learners

assessment

Digital Tools and Technologies Used

A defining feature of the AGRO-INSURE OER is its integration of H5P (HTML5 Package), an open-source content framework that enables the creation of rich, interactive learning experiences directly within web-based environments. Through H5P, the AGRO-INSURE modules incorporate a variety of dynamic content types, including:

- interactive presentations
- knowledge checks, quizzes, and
- scenario-based activities directly within the learning flow

In addition, the platform operates within a Learning Management System (LMS) environment, which supports structured access to modules, user navigation, and flexible learning pathways. Multimedia elements such as videos, visuals, and digital case studies further enhance the learning experience.

This interactive presentation enhances adult learning by:

1. Encouraging active participation rather than passive reading.
2. Supporting self-paced learning, so users can revisit and repeat interactions as needed.
3. Allowing feedback loops within activities to reinforce correct understanding.
4. Providing an engaging blend of multimedia and assessment tools suited for diverse learners.

Pedagogical Approach

The AGRO-INSURE resource is grounded in a learner-centered and outcomes-oriented pedagogical approach, aligned with contemporary VET practices. By leveraging interactive digital technologies, it transforms traditional content into immersive learning experiences. The use of H5P allows the modules to move beyond static text-based instruction, enabling:



- flexible and blended learning, allowing use in self-trainer-led, and formal or non-formal VET settings; learning,
- immediate feedback through embedded assessment tools;
- iterative learning, where learners can revisit and repeat activities;
- integration of multimedia elements to support different learning styles.

This approach supports active learning, practical skills acquisition, and real-world applicability.

Relevance for VET Contexts

The AGRO-INSURE OER is designed to operate within a blended VET framework, combining school-based vocational instruction with digitally mediated learning activities. It can be effectively used in:

- school-based vocational education and
- practical oriented training;

Its modular and flexible structure allows educators to integrate the content into existing curricula while also supporting independent learning pathways.

Learning Objectives

Through its interactive and practice-oriented design, the AGRO-INSURE resource supports the development of:

- knowledge of sustainable urban agriculture on industrial surfaces;
- ability to assess environmental, economic, and social impacts of urban farming practices;
- digital competences related to navigating and engaging with online learning environments;
- support informed decision-making, policy development, and sustainable planning for urban agriculture in European cities and beyond.

BEST PRACTICE: ECO-VIBES



Overview, Purpose and Impact

The [ECO-VIBES](#) Digital Simulation Scenarios represent an innovative and impactful best practice in Vocational Education and Training (VET), focusing on the development of digital entrepreneurial skills and eco-innovation competences for small

Source: [ECO-VIBES](#)



and medium-sized enterprises (SMEs). Developed through a transnational collaboration between institutions in Bulgaria, Greece, and Cyprus, the initiative addresses the growing need for training solutions that combine entrepreneurship, sustainability, and digital transformation.

The primary purpose of ECO-VIBES is the creation and growth of environmentally responsible enterprises, enhancing green and blue economy skills, and providing practical digital learning tools that help entrepreneurs integrate sustainability, innovation, and competitiveness into their business strategies.

Through its implementation, the project has produced a comprehensive and structured training ecosystem, including a full curriculum of e-learning modules, practical business tools, and a digital simulation environment. This ecosystem supports learners (eco-innovators and SME founders) in acquiring both theoretical knowledge and applied skills, ensuring that training remains relevant to real-world entrepreneurial contexts.

A key innovation of ECO-VIBES was the creation of a digital simulation environment, which allows learners to navigate realistic business scenarios, make strategic decisions, and see the consequences of their choices, thus reinforcing applied skills, assessment feedback, and reflection. In addition, the project produced a case-based adoption handbook to support trainers and implementers in using and adapting the materials effectively in diverse VET settings, including guidance on pedagogy, use-cases, and training delivery. These outputs supported increased engagement, development of entrepreneurial and digital competences, and enhanced capacity for sustainable business innovation among learners and educators.

The impact of the ECO-VIBES approach is reflected in:

- increased learner engagement through interactive and practice-oriented content;
- improved understanding of sustainable business models and eco-innovation processes;
- development of entrepreneurial and digital competences;
- enhanced capacity for innovation and sustainable enterprise development;



Overall, ECO-VIBES demonstrates how well-designed digital learning environments can bridge the gap between theory and practice, providing learners with the tools and competences needed to succeed in sustainable entrepreneurship.

Learning Context and Digital Solution

The ECO-VIBES learning environment is delivered through a web-based e-learning platform, designed for flexible use across vocational education, lifelong learning, and professional upskilling contexts. It supports self-paced learning and integrates:

- structured learning modules on entrepreneurship and sustainability;
- case-based content reflecting real-world business challenges;
- analytical tools for business planning;
- interactive simulation scenarios supporting applied learning.

This digital approach ensures accessibility, scalability, and adaptability for diverse learner profiles and training environments.

Evidence of Success and Lessons Learned

The ECO-VIBES project has demonstrated early signs of success through the development and deployment of its digital entrepreneurial training, student engagement, and positive learner feedback. The project's e-learning courses and digital simulation tools are delivered through a multilingual online platform that gives learners clear and easy access to practical entrepreneurship content. This digital environment allows learners to develop sustainable business skills in a flexible way, learning at their own rhythm and applying knowledge through interactive, real-life scenarios. Early usage and learner interaction with the training resources indicate that participants are engaging with core concepts and tools relevant to eco-innovation and business model development, reflecting the applicability of the content in real entrepreneurial contexts.

The ECO-VIBES platform contains well-designed interactive online modules that increase learner engagement, understanding, and skill development by combining theoretical input with practical exercises and real-life scenarios. These findings highlight that clear



guidance, digital simulations, and practical tools can support meaningful learning outcomes, while also revealing the need for ongoing refinement of course duration, communication strategies, and integration of feedback mechanisms to maximize effectiveness and adaptability.

Transferability and Scalability

The ECO-VIBES model is highly transferable and scalable due to its modular digital simulation-based design, which allows the learning scenarios to be easily adapted to different VET sectors, target groups, and national contexts. The digital simulation scenarios are built on generic entrepreneurial decision-making processes—such as business planning, sustainability assessment, market analysis, and innovation strategy—which are applicable across a wide range of vocational fields beyond eco-entrepreneurship such as:

- tourism and hospitality;
- agriculture;
- manufacturing and industry;
- social entrepreneurship.

The fully digital format enables large-scale implementation, cross-border use, and integration into both initial and continuing VET programmes. The inclusion of digital badges supports learners to receive visible recognition of their progress and acquired competences upon completion of learning activities or modules.

Greece– Open Educational Resources and Best Practices in VET

OER: Open Access Collection of 130 updated training guides

Overview and Purpose

The **Open Access [Collection of 130 Updated VET Training Guides](#)**, developed by the National Organization for the Certification of Qualifications and Vocational Guidance (EOPPEP) in collaboration with social partners and under the auspices of the Ministry of Education and the General Secretariat for Vocational Education and Training, represents



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a major national initiative aimed at modernizing vocational education in Greece.
Source: <https://www.canva.com/>

Released in 2024 within the framework of the project *“Development of training guides and educational materials for Institutes of Vocational Training (SAEK)”*, this comprehensive collection provides structured, up-to-date, and high-quality learning materials aligned with labour-market needs, occupational standards, and European frameworks.



The training guides cover a wide range of vocational specialties and include:

- specialized training guides for each field of study;
- structured educational content linked to occupational profiles;
- question banks and assessment materials;
- supporting resources for trainers, learners, and apprenticeship stakeholders;
- methodological frameworks for curriculum design and implementation.

A key feature of the initiative is its systematic approach to translating professional activities into clearly defined learning outcomes, ensuring strong alignment with labour-market demands, ESCO classifications, and international good practices. Through this structure, the resource supports the development of relevant skills and enhances the overall quality, transparency, and effectiveness of VET provision in Greece.

Beyond its content, the initiative brings important added value to the VET system by offering a nationally standardized and publicly accessible resource base, promoting consistency and quality across programmes, and supporting both trainers and learners with clear and structured guidance. It also enhances the overall modernization of VET by aligning training provision with real occupational requirements and contemporary educational practices.

Digital Tools and Technologies Used



The SAEK training guides are delivered through digital repositories hosted by the General Secretariat of Vocational Education and Training, ensuring open and free access to all materials.

The digital environment includes:

- online access to training guides and educational materials;
- downloadable documents and structured curricula;
- centralized digital repositories for distribution and storage;
- compatibility with institutional learning environments used in VET provision.

Although primarily document-based, their digital availability facilitates easy dissemination, reuse, and integration, supporting the principles of openness and accessibility associated with OER.

Pedagogical Approach

The SAEK training guides are grounded in a competence-based, learner-centered, and outcomes-oriented pedagogical approach, aligned with contemporary European VET principles.

At the core of this methodology is the translation of real occupational tasks into measurable learning outcomes, ensuring that training is directly connected to workplace requirements. This reflects a transition from traditional content-driven instruction to performance-based learning, where knowledge, skills, and competences are developed in an integrated way.

The approach combines:

- theoretical instruction;
- laboratory-based and practical training;
- structured work-based learning (apprenticeships);
- continuous assessment aligned with professional standards.

This integrated model supports **active and experiential learning**, enabling learners to progressively build practical competences and assume professional responsibility in real or simulated work environments.



Relevance for VET Contexts

The SAEK training guides play a central role in strengthening the coherence and effectiveness of vocational education in Greece. While primarily designed for school-based VET, their structure and methodology naturally extend to work-based learning and apprenticeship contexts, where alignment between training and professional practice is essential.

They serve not only as learning materials but also as reference tools for programme design, instructional planning, and assessment, supporting trainers, institutions, and policymakers in delivering high-quality vocational education. By providing a common framework across specialties, the guides contribute to a more coordinated and transparent VET system, where learning pathways are clearly defined and linked to occupational standards.

They are particularly valuable for:

- VET trainers and programme designers;
- learners enrolled in vocational training programmes;
- institutions delivering initial vocational education;
- stakeholders involved in training implementation and evaluation.

Learning Objectives

Through their competence-based design, the SAEK training guides support learners in developing a combination of technical, cognitive, and professional competences that are directly relevant to the labour market.

Learners are guided to not only acquire occupation-specific knowledge, but also to apply this knowledge in practical contexts, strengthening their ability to solve problems, perform tasks, and adapt to real working environments. The structured progression of learning outcomes helps them understand professional roles and responsibilities, while the integration of assessment supports continuous reflection and improvement.



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In this way, the guides contribute to the development of well-rounded vocational profiles, where theoretical understanding, practical skills, and professional awareness are closely interconnected.

BEST PRACTICE: Daissy

Overview, Purpose and Impact

The [DAISSy Research Group](https://daissy.eu/projects/) of the Hellenic Open University (HOU) represents a mature and highly impactful example of digital innovation in Vocational Education and Training (VET) and lifelong learning. Over more than two decades of continuous activity, DAISSy has established itself as a key actor in advancing digital education by combining research, pedagogical innovation, and practical implementation. Operating within both national and European contexts, DAISSy responds to one of



Source:

<https://daissy.eu/projects/>

the most pressing challenges faced by VET systems today: the need to strengthen the digital readiness of educators and institutions, while ensuring that learning remains inclusive, engaging, and relevant to contemporary societal and labour-market demands. In doing so, the initiative goes beyond technical training, embracing a broader vision that integrates digital, green, and citizenship competences, alongside a strong commitment to equity, diversity, inclusion (EDI), and multiculturalism.

Through its extensive experience—reflected in participation in more than 120 national and European projects across diverse interdisciplinary fields—DAISSy has developed a rich ecosystem of digital learning solutions. These include online platforms, Massive Open Online Courses (MOOCs), self-assessment tools, and interactive applications that support both educators and learners in navigating digital environments. At the same time, the initiative actively promotes STEAM education, fostering creativity, critical thinking, and innovation across disciplines.

The impact of DAISSy is particularly visible in the way it empowers educators to transform their teaching practices. Trainers who engage with DAISSy's programmes gain confidence in using digital tools, develop skills in digital content creation, and adopt more interactive and learner-centered approaches. For learners, this translates into more engaging and meaningful educational experiences, where digital technologies are used not only as tools, but as enablers of active participation and knowledge construction.



Ultimately, DAISSy demonstrates how a sustained and holistic approach to digital education can contribute to systemic transformation, improving the quality of teaching, enhancing learner outcomes, and supporting the development of more inclusive and resilient education systems.

Learning Context and Digital Solution

DAISSy operates across a wide spectrum of educational contexts, including vocational education, adult learning, and lifelong learning, addressing both initial training and continuous professional development. Its interventions are designed to be flexible and adaptable, allowing learners and educators to engage with digital tools and resources in ways that respond to their specific needs and contexts.

The digital solutions developed by DAISSy are diverse yet interconnected. Online learning platforms provide structured environments for course delivery, while MOOCs enable large-scale access to knowledge without barriers. Self-assessment tools allow learners to reflect on their competences and track their progress, while interactive applications and digital games introduce elements of engagement and motivation into the learning process.

Together, these tools create a dynamic digital learning ecosystem that supports not only knowledge acquisition but also the development of practical skills and competences. By making learning accessible anytime and anywhere, DAISSy contributes to the expansion of lifelong learning opportunities and supports continuous upskilling in an increasingly digital world.

Evidence of Success and Lessons Learned

The long-standing experience of DAISSy provides strong evidence of its effectiveness, relevance, and sustainability in the field of digital education and VET innovation. Over the years—and through participation in more than one hundred twenty (120) national and European projects across multiple interdisciplinary fields and frameworks—the initiative has demonstrated its capacity to deliver impactful and scalable solutions in diverse educational contexts.

This extensive project portfolio reflects not only the breadth of DAISSy's expertise but also its ability to respond to evolving educational needs, policy priorities, and technological developments. Through these projects, DAISSy has reached a wide range



of stakeholders, including educators, learners, institutions, and policymakers, contributing to the strengthening of digital competences and the modernization of teaching practices.

Transferability and Scalability

A defining strength of DAISSy is its ability to be **adapted and scaled across different contexts**. The tools, methodologies, and frameworks developed are modular and flexible, allowing them to be tailored to the specific needs of VET institutions, training centers, and adult education providers.

Because the approach is aligned with European priorities and frameworks, it can be easily transferred across countries and sectors. Whether implemented in small training centers or large educational institutions, DAISSy's model supports the development of digital competences and pedagogical innovation in a consistent and sustainable way.

Italy – Open Educational Resources and Best Practices in VET

OER: ITS Academy

Overview and Purpose

The [ITS \(Istituti Tecnici Superiori\) Academy Open Didactic Materials](#) represent a key component of Italy's advanced vocational education system, providing a rich collection of publicly accessible educational resources designed to support high-level technical training aligned with labour-market needs. Developed by Italy's Higher Technical Institutes, these materials reflect a strong connection

source: ITS – Higher Technical Institutes – Indire



between education and real workplace practices. The resources cover a wide range of strategic sectors essential to Italy's economic development, including energy and sustainability; logistics; ICT and digital technologies; life sciences and chemistry; agri-food; manufacturing and mechatronics; tourism and cultural heritage. This sectoral diversity ensures that the materials remain relevant to both current and emerging industry demands.

The ITS model itself reinforces the added value of these resources. With approximately 50% of trainers coming directly from industry and at least 30% of learning taking place in



real work environments supporting WBL, the materials are grounded in authentic professional contexts. As open educational resources, they support not only learners but also trainers and institutions by providing accessible, practice-oriented, and high-quality content that can be reused and adapted across different training settings.

Digital Tools and Technologies Used

The ITS Academy materials integrate a wide range of digital tools and technologies that reflect the realities of modern industrial and technological environments. Learning is supported through Learning Management Systems (LMS) such as Moodle and Google Classroom, enabling structured delivery and access to content.

In addition, learners engage with:

- simulation software, including PLC simulators, logistics systems, and CAD/CAM tools;
- robotics platforms, such as Arduino, Raspberry Pi, and collaborative robots (cobots);
- Industry 4.0 technologies, including IoT systems, sensors, and digital twins;
- video-based learning tools for demonstrations and technical explanations;
- cloud platforms such as Google Workspace and Microsoft 365 for collaboration and project work.

These technologies create a digitally rich learning environment that mirrors real industrial settings and prepares learners for modern workplaces.

Pedagogical Approach

The ITS Academy materials are based on a competence-based and highly applied pedagogical approach, where learning is closely linked to real-world professional tasks and industry standards.

The learning experience is characterized by:

- project-based and problem-based learning, where learners work on real or simulated industry challenges;



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- work-based learning, integrating internships and company-based projects;
- simulation-based learning, allowing learners to practice technical processes in safe environments;
- flipped classroom approaches, particularly in digital and technical subjects;

Relevance for VET Contexts

The ITS Academy OER is highly relevant for modern VET systems, as it bridges the gap between education and the labour market. It supports multiple learning contexts, including:

- school-based vocational education through classroom and laboratory activities;
- work-based learning through internships and company projects;
- apprenticeship pathways within dual education systems;
- blended learning environments combining digital and face-to-face instruction.

Its strong integration with industry makes it particularly valuable for ensuring that training remains responsive to technological developments and labour-market needs, while also supporting collaboration between education providers and enterprises.

Learning Objectives developed

Through its integrated and practice-oriented design, the ITS Academy materials support the development of a wide range of competences that are essential for today's workforce.



Learners are guided to develop advanced technical skills specific to their sector, such as robotics, ICT systems, logistics operations, or energy technologies, while also gaining hands-on experience with digital tools and Industry 4.0 processes.

By engaging in real-world projects and work-based learning experiences, learners build the ability to apply knowledge in professional contexts, collaborate effectively, and adapt to complex and evolving work environments. The competence-based structure also ensures alignment with national qualification standards, supporting transparency and recognition of skills.

Best Practice: Futura Labs

Overview, Purpose and Impact

Futura Labs – **Laboratori per le Competenze Digitali**, developed by the **Ministero dell'Istruzione e del Merito (MIM)**, is a large-scale national initiative aimed at transforming vocational education and training in Italy through the creation of digital laboratories and providing open training resources for trainers and learners.



Source: [Futura Labs](#)

Implemented across multiple Italian regions—including Lombardia, Veneto, Emilia-Romagna, Piemonte, Toscana, Lazio, Sardegna, Puglia, and Sicilia—the initiative responds to the urgent need to modernize VET systems and align them with the demands of Industry 4.0 and the digital economy.

At its core, Futura Labs seeks to strengthen the digital competences of both learners and educators, while fostering innovation, creativity, and collaboration. By equipping VET centres with advanced digital laboratories and open learning resources, the initiative creates opportunities for learners to engage with real-world technologies such as robotics, artificial intelligence, virtual and augmented reality, and the Internet of Things (IoT).

The impact of Futura Labs is reflected in its ability to reshape the learning experience. Learners become active participants in hands-on, technology-driven environments, developing skills that are directly relevant to modern workplaces. At the same time, trainers enhance their digital pedagogy, enabling them to design more interactive, flexible, and engaging learning pathways. Overall, the initiative contributes to increased learner motivation, improved employability, stronger links with industry, and the reduction of regional disparities in access to digital education.



Learning Context and Digital Solution

Futura Labs operates across a wide range of VET contexts, including school-based vocational education, apprenticeships, work-based learning, and blended learning environments. This flexibility allows the initiative to reach diverse learner groups and adapt to different institutional settings.

The digital solution is centered on the creation of advanced digital laboratories and maker-oriented learning spaces, where learners can experiment with and apply new technologies in practice. These environments are supported by:

- robotics kits and digital manufacturing tools such as 3D printers and CNC machines;
- VR/AR headsets and immersive learning technologies;
- IoT sensors and smart systems;
- cloud-based platforms for collaboration and project development;
- interactive digital modules and open educational resources.

By combining physical and digital elements, Futura Labs creates hybrid learning environments that mirror real industrial and technological settings, making learning both relevant and engaging.

Evidence of Success and Lessons Learned

Futura Labs has already demonstrated significant success at a national level. More than 1,000 digital laboratories have been established across Italy, with strong adoption among VET centers and positive evaluations from trainers and regional authorities.

The initiative has led to increased participation in digital VET pathways and has contributed to the modernization of teaching practices. Learners show higher levels of engagement and motivation, while educators report improved confidence in using digital tools and methodologies.

At the same time, the implementation of Futura Labs has generated important lessons. One key insight is that trainer upskilling is essential to fully leverage the potential of digital



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laboratories. Additionally, hands-on, project-based approaches have proven highly effective in improving learning retention and engagement. The experience also highlights the importance of strong partnerships with enterprises, which help ensure that training remains relevant and innovation-driven. Finally, it underscores the need to address digital inclusion from the outset, ensuring equal access to high-quality learning environments.

Transferability and Scalability

One of the defining strengths of Futura Labs is its high level of **transferability and scalability**. The model is based on modular digital laboratories and open resources that can be adapted to different sectors, institutional contexts, and regional needs.

The approach can be implemented in various ways, from small-scale labs in rural training centers to large, fully equipped innovation hubs in urban areas. Its flexibility allows other countries and regions to adopt the model by:

- developing local digital labs tailored to sectoral priorities;
- investing in trainer digital professional development;
- integrating digital technologies into vocational curricula;
- building partnerships with industry and innovation ecosystems.

Spain – Open Educational Resources and Best Practices in VET

OER: UPM en Abierto

Overview and Purpose

[UPM en Abierto](#), developed by the Universidad Politécnica de Madrid, is a comprehensive Open Educational Resource platform that provides free and open access to high-quality academic and technical training. Functioning as a hub for Massive Open Online Courses (MOOCs) and OpenCourseWare (OCW), it aims to democratize access to advanced knowledge and support continuous learning across diverse audiences.

Source: [UPM en Abierto](#)

UPM Open



Universidad Politécnica de Madrid



Universidad Politécnica de Madrid



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The platform is designed to respond to the evolving needs of Spain's strategic industries by offering specialized training in areas such as engineering, ICT and artificial intelligence, circular economy, agrifood systems, environmental management, tourism, and applied sciences. Through this broad thematic coverage, UPM en Abierto enables learners to acquire advanced, sector-specific competences aligned with modern labour-market demands.

A key strength of the platform lies in its open and flexible nature. All courses are fully online and free of charge, allowing users to access learning materials without barriers. The inclusion of certification options further enhances its value, providing learners with formal recognition of their achievements and supporting their professional development.

Digital Tools and Technologies Used

UPM en Abierto integrates a variety of digital tools and technologies to deliver a rich and interactive learning experience. The platform is primarily hosted on Learning Management Systems (LMS) such as Moodle, which support structured course delivery and learner progression.

In addition, the learning environment incorporates:

- video-based platforms (e.g., YouTube) for lectures and demonstrations;
- cloud-based tools such as Microsoft SharePoint for resource sharing and collaboration;
- digital documents and downloadable materials (PDFs and course notes);
- interactive and gamified tools, including simulation environments developed with platforms like Unity.

These technologies enable learners to engage with content in multiple formats, supporting both theoretical understanding and practical application.

Pedagogical Approach



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The pedagogical framework of UPM en Abierto is characterized by a flexible, learner-centered, and competency-based approach. Learning is structured in clearly defined modules that guide participants through a coherent progression of topics while allowing them to study at their own pace.

The platform combines:

- multimedia content, including videos, presentations, and readings;
- interactive exercises and simulations;
- self-assessment tools for monitoring progress;
- problem-based learning approaches

This approach encourages learners to actively engage with the material, apply knowledge to practical situations, and develop a deeper understanding of complex technical concepts. The integration of industry-aligned standards ensures that learning outcomes remain relevant and applicable to professional contexts.

Relevance for VET Contexts

Although developed within a higher education environment, UPM en Abierto is highly relevant for VET, particularly in post-secondary vocational education, upskilling, and reskilling pathways. It supports school-based and digital learning contexts by providing accessible and high-quality content that can complement formal training programmes.

The platform is especially valuable for:

- VET trainers seeking reliable and specialized teaching materials;
- learners preparing for technical careers or higher education pathways;
- Industry professionals aiming to update their skills in rapidly evolving sectors.

Its open-access model makes it a powerful tool for promoting lifelong learning and continuous professional development, bridging the gap between academic knowledge and vocational application.

Learning Objectives Developed



Through its diverse and structured learning content, UPM en Abierto supports the development of both technical and transversal competences. At the end of a UPM en Abierto course, learners will be able to:

- Master the specific technical skills needed in fields like engineering, ecotourism, and food production to handle real-world tasks.
- Meet high-quality standards by reaching learning goals that perfectly match the official Spanish qualification requirements.
- Keep pace with the latest innovations and technological advancements that are constantly reshaping their specific industry.
- Navigate digital platforms with ease to manage their own learning, complete assessments, and organize project documentation.

Best Practice: Aula Ateca

Overview, Purpose and Impact

[Aula Ateca](#) (Aulas de Tecnología Aplicada), implemented by the Ministerio de Educación y Formación Profesional (MEFP), represents a transformative national initiative aimed at redefining vocational education and training in Spain through the integration of advanced digital technologies and innovative learning environments.



Deployed across multiple regions—including Madrid,

Source: [Aula Ateca](#)

Cataluña, Comunidad Valenciana, Castilla y León, Andalucía, and others—the initiative introduces technology-rich learning spaces within VET centres, designed to simulate real Industry 4.0 environments. These spaces function as innovation hubs where traditional classrooms are reimagined as dynamic, interactive, and practice-oriented environments.

The core purpose of Aula Ateca is to bridge the gap between education and the rapidly evolving technological demands of the labour market. By integrating tools such as virtual reality (VR), digital twins, robotics, and 3D printing, learners are given the opportunity to practice complex technical tasks in safe, virtual, and cost-effective settings.

The impact of the initiative is substantial. Learners develop advanced technical and transversal skills, become more engaged and motivated, and gain exposure to cutting-



edge technologies that enhance their employability. At the same time, educators strengthen their digital pedagogical competences, and institutions benefit from modernized infrastructure and innovative teaching practices.

Learning Context and Digital Solution

Aula AtecA operates across diverse learning contexts, including school-based VET, virtual learning, and blended learning environments, with a strong emphasis on the “learning by doing” approach.

The digital solution is centered on the creation of advanced, multifunctional learning spaces equipped with next-generation technologies. These include:

- virtual and augmented reality simulators (e.g., VR headsets, Microsoft HoloLens, XR technologies);
- specific programs and software (Microsoft Dynamics 365 Guides, Aurora, WinUnisoft)
- 3D printers, scanners, and digital manufacturing tools;
- robotics systems and collaborative robots;
- recording and streaming equipment for content creation and real-time collaboration.

These tools allow learners to engage in immersive, interactive, and practical learning experiences that closely replicate real working environments, while also ensuring safety and sustainability.

Evidence of Success and Lessons Learned

Aula AtecA has demonstrated significant success at a national scale. More than 1,400 AtecA classrooms have been established across Spain, with strong uptake in VET centres and positive feedback from educators and regional authorities. The initiative has been supported by Next Generation EU funding, further reinforcing its strategic importance.

Educators report higher levels of confidence in using digital tools and designing innovative learning experiences, while institutions benefit from modernized teaching practices and stronger links with industry.



At the same time, important lessons have emerged. The success of such initiatives depends heavily on continuous professional development for trainers, ensuring they can effectively use advanced technologies. It has also become clear that pedagogical design must guide technological integration, and that digital inclusion must be a priority to avoid widening existing inequalities. Additionally, simulation-based learning has proven highly effective in building learner confidence, particularly in high-risk or technically complex fields.

Transferability and Scalability

Aula AtecA is highly transferable and scalable, making it a valuable model for other countries and regions seeking to modernize their VET systems because:

- The AtecA layout can be scaled down for small rural schools or expanded into large urban tech hubs without losing its educational impact
- It offers a sustainable solution for schools that need to provide high-quality training on a limited budget
- The core technologies (VR, robotics, etc...) can be seamlessly adapted to any field

Other countries or regions can adopt the model by:

- Identifying local industrial strengths and specific skill gaps to customize the AtecA technology stack
- Launching a few beacon schools that serve as regional prototypes
- Developing a shared digital library where trainers can upload and download VR simulations, 3D printing templates, and lesson plans
- Linking student projects with real-world company challenges

This adaptability ensures that Aula AtecA can support both local innovation and broader systemic transformation in VET.



Ethiopia - Open Educational Resources and Best VET

Practices in

OER: National Academic OER & Digital Library of Ethiopia (NDL)

Overview and Purpose

The [National Academic OER & Digital Library of Ethiopia](#) (NDL) is a government-supported platform that aggregates open educational resources from Ethiopian universities and TVET institutions. It provides free access to academic and vocational learning materials to enhance teaching, learning,



source: [NDL](#)

and research. The platform supports competency based and flexible learning by offering digital content that can be adapted for TVET programmes across Ethiopia.

Digital Tools and Technologies Used

The platform integrates digital libraries, Learning Management Systems (LMS), digital libraries, mobile learning applications, video conferencing tools (Zoom, Google Meet, Microsoft Teams), digital textbooks (PDF), multimedia learning objects, discussion forums, email communication tools, and online assessment platforms. These technologies support access, interaction, and assessment in digital learning environments.

Pedagogical Approach and Learning Experience

NDL follows a competency-based, learner-centered approach, combining blended and flexible learning pathways. It supports self-directed learning, practical skill development, and the use of real-world vocational scenarios enriched by digital content.

Relevance for VET Contexts

The platform is highly relevant for TVET, as it supports school-based, workplace-based, and distance learning. It enables institutions and trainers to access adaptable resources aligned with industry needs and modern vocational training practices.

Learning Objectives Developed

Learners will be able to independently access and use free digital learning materials, develop ICT and digital literacy skills, collaborate online, and apply vocational knowledge in real-world contexts. Trainers will be able to integrate OER into instruction, design flexible and blended courses, monitor learner progress digitally, and align training with industry needs.



Best Practice: MOPEDE

Overview and Purpose

The [Capacity Building for Modernizing TVET Pedagogy in Ethiopia \(MOPEDE\)](#) project represents a transformative best practice in advancing digital learning within Technical and Vocational Education and Training (TVET) in Ethiopia. Implemented between 2020 and 2024 through a collaboration between the Federal Republic of Ethiopia's Technical and Vocational Training Institute and its 15 satellite colleges (TVTI) and Finnish partners—Jamk

source: [MOPEDE](#)



University of Applied Sciences and Centria University of Applied Sciences—the initiative has played a pivotal role in modernizing teaching and learning practices. At its core, the project aimed to institutionalize e-learning across TVTI and its 15 satellite colleges, integrating digital learning into curricula and promoting a shift toward student-centered blended learning. This transformation aligns with Ethiopia's national education strategies, including the Education Development Roadmap and TVET for Sustainable Development frameworks. The impact of the MOPEDE project is far-reaching. It has strengthened capacity of VET institutions to deliver modern, flexible, and industry-relevant education, enhanced digital competences among educators and learners, and contributed to the creation of a more resilient and future-oriented TVET system. Overall MOPEDE contributed to the aims emphasized in Ethiopian Education Development Roadmap (EEDR, 2018), framework document of Technical Vocational Education and Training for Sustainable Development (TSDP, 2018), and in the Growth and Transformation Plan of Ethiopia (GTP II, 2016).

Learning Context and Digital Solution

The MOPEDE initiative operates within a blended learning environment, combining traditional classroom instruction with digital and online learning modalities. The project introduced and embedded e-learning systems across institutions, ensuring that online learning is not an add-on but an integral part of the educational process.

The digital solution included:

- Development of e-Learning lab to provide state-of-the-art facilities for TVTI teachers to create online resources for vocational education.



- Development of LMS platform to host online learning resources and develop policies and procedures to manage and administer them.
- Capacity building initiatives aimed at strengthening digital pedagogy skills through a cascaded Training of Trainers (ToT) programme.
- Enhancement of institutional leadership capacity to effectively manage online learning and drive digital transformation, supported by a structured change management programme.

This approach enables flexible learning pathways while maintaining strong connections to practical and vocational training components, ensuring that learners benefit from both theoretical and applied learning experiences.

Evidence of Success and Lessons Learned

The success of the MOPED project is reflected in the institutionalization of e-learning across TVTI and its satellite colleges, demonstrating a systemic shift in how education is delivered. The project has enhanced the digital readiness of institutions, improved teaching practices, and increased the accessibility of learning opportunities.

A key outcome is the publication of the guidebook [*"Digital Transformation of Learning Environments: From the Classroom to Student-Centered Online Learning"*](#), which documents the project's journey, methodologies, and results. This resource provides practical guidance on topics such as change management, staff development, quality assurance, and technical implementation.

Important lessons learned include:

- Cultural Sensitivity and Adaptability: Respecting cultural differences strengthened trust, collaboration, and overall project effectiveness.
- Effective Communication and Collaboration: Clear communication and digital tools ensured alignment, coordination, and efficient teamwork across locations.
- Flexibility and Adaptation: Adapting to change and challenges supported innovation and maintained project progress.
- Team Empowerment and Leadership: Empowering teams and providing strong leadership enhanced ownership, creativity, and performance.



- Continuous Learning and Reflection: Regular feedback and reflection improved processes and informed better decision-making.

Transferability and Scalability

The MOPEDE model is highly **transferable and scalable**, offering a valuable framework for other countries and institutions seeking to modernize their TVET systems.

Its scalability is supported by:

- a structured approach to institutionalizing e-learning;
- emphasis on teacher training and capacity building;
- use of adaptable digital platforms and tools;
- alignment with national and international education strategies.

Madagascar - Best Practice in VET

Best Practice: D-CLIC program

Overview and Purpose

The [D-CLIC Programme](#) – “Train in Digital Skills with the OIF”, implemented in Madagascar through collaboration between the International Organization of La Francophonie and the Ministry of Technical

source: <https://www.canva.com/>



Education and Vocational Training, represents a best practice in digital vocational education and youth employability.

Building on a successful [pilot phase \(2021–2022\)](#), the initiative has transitioned into a **scaled national programme**, aiming to train 1,000 young people in digital professions by mid-2026 and contributing to a broader national target of 40,000 beneficiaries by 2028. The pilot phase already demonstrated promising results across multiple countries, including Madagascar, by improving access to market-relevant digital skills and strengthening local training ecosystems

The programme addresses critical national challenges, including high youth unemployment, limited access to training, and the growing demand for digital skills in an increasingly digitalized economy. By offering free, accessible, and labour-market-oriented



training, it will support young people in acquiring practical competences that enhance employability, foster entrepreneurship, and facilitate professional integration.

Learning Context and Digital Solution

The D-CLIC programme will operate within a flexible and digitally supported learning environment, combining online training with structured support mechanisms.

The digital solution includes:

- a train-the-trainer model, beginning with the training of national instructors;
- an online learning platform providing structured training pathways;
- digital modules aligned with labour market needs;
- a support network ensuring ongoing guidance and mentoring for learners.

This approach enables large-scale deployment while ensuring quality and sustainability, as trained instructors continue to support future cohorts.

Evidence of Success and Lessons Learned

Evidence of success for the D-CLIC programme in Madagascar is primarily drawn from the pilot phase (2021–2022) and its implementation across multiple Francophone countries.

Key findings from the pilot phase include:

- Positive initial outcomes in improving access to digital skills training for young people,
- Strengthened capacity of local training providers through collaboration with international partners;

The current phase in Madagascar is still under implementation, and therefore its long-term impact and outcomes are yet to be fully assessed. However, it builds directly on validated approaches from the pilot phase.



Transferability and Scalability

The D-CLIC model demonstrates strong potential for transferability and scalability, as evidenced by its expansion from a pilot initiative to a programme implemented across more than 14 countries within the Francophone space

Malawi - Open Educational Resource

OER: STEP

Overview and Purpose

The [STEP Malawi Resources Repository](#), developed under the Skills and Technical Education Programme (STEP), serves as a comprehensive collection of open educational materials aimed at strengthening Technical and Vocational Education and Training (TVET) in Malawi. The platform provides access to a source:
[STEP Malawi Resources Repository](#)



diverse range of resources, including publications, training manuals, research reports, multimedia content, and orientation toolkits designed to support both institutional capacity building and learner development.

These resources are primarily focused on improving the quality, inclusiveness, and relevance of TVET provision, particularly by supporting educators, trainers, and institutions with practical tools and guidance aiming to enhance access to knowledge, promote skills development, and support the professionalization of TVET systems in Malawi.

Digital Tools and Technologies Used

The STEP Malawi OER repository is delivered through an online platform, making resources accessible to a wide range of users. The platform includes:

- downloadable publications and training manuals;



- digital research reports and guidance documents;
- multimedia resources such as videos and audio materials;
- orientation toolkits supporting training delivery and institutional development.

Although the resources are primarily document-based, their digital availability enables easy access, sharing, and reuse, particularly in contexts where flexible and remote learning is essential.

Pedagogical Approach

The pedagogical approach underpinning the STEP resources is practice-oriented, competency-based, and system-focused, supporting both teaching and institutional development. The materials are designed to guide trainers and institutions through structured processes, such as curriculum development, training design, and evaluation.

For instance, training manuals developed under STEP include frameworks for creating a Safe and Supportive Learning Environment; Lessons for Supporting Business Incubators in Malawi; lessons learned in Delivery of nonformal Skills Training, code of conduct; assessment, and continuous improvement, ensuring that educational content aligns with occupational standards and real-world requirements. The learning experience is therefore not limited to individual learners but extends to capacity building for educators and institutions, promoting effective teaching practices, supportive learning environments, and quality assurance mechanisms.

Relevance for VET Contexts

The STEP Malawi OER is highly relevant for TVET systems, particularly in contexts where there is a need to strengthen institutional capacity and improve the quality of training delivery.

The resources support:

- technical colleges and community training centers;
- trainers and instructors seeking practical teaching guidance;
- institutional managers responsible for programme delivery;



- policymakers and stakeholders involved in TVET development.

By providing structured and practical materials, the repository contributes to improving both formal and non-formal vocational education, ensuring that training systems are better aligned with labour-market needs and inclusive education priorities.

Learning Objectives Developed

The STEP Malawi resources support the development of a wide range of competences mainly at institutional level. For educators and institutions, the resources enhance pedagogical competences, curriculum design skills, and quality assurance capabilities. They also support the creation of more inclusive and supportive learning environments, which is particularly important in addressing gaps in access and participation in TVET systems.

Mozambique - Best Practice in VET

OER: Open and Innovative Schooling (OIS) Mode

Overview and Purpose

The [Open and Innovative Schooling \(OIS\) Model](#), implemented by the National Institute of Distance Education under the Ministry of Education and Human Development (MINEDH), with support from the Commonwealth of Learning, represents a strategic response to the limited access to secondary education in Mozambique.



Piloted between 2018 and 2020 across fifteen

secondary schools nationwide, the initiative was designed to develop digital learning resources and

source: [OIS](#)

introduce technology-enabled learning providing access to curriculum-based digital Open Educational Resources (OER) through an offline digital device (Aptus), allowing learners and teachers to access educational content without requiring continuous internet connectivity.

The purpose of the initiative is to expand access to quality secondary education, improve learner performance, and support inclusive education—particularly for learners who face barriers related to geography, cost, or time constraints. By integrating digital resources



into both distance and face-to-face learning, the OIS model enhances the overall learning experience while reducing reliance on printed materials.

Digital Tools and Technologies Used

The OIS model is built around the use of the Aptus device, a low-cost, offline digital server that stores and distributes educational content via a local wireless network. This allows learners and teachers to access a wide range of multimedia resources—including texts, videos, and self-assessment tools—using their own devices such as mobile phones, tablets, or computers. In preparation for the launch, over 1,600 e-learning resources developed by Mozambique’s Ministry of Education and Human Development were loaded on 15 [Aptus](#) devices and handed to staff of the pilot schools who were trained to use the Aptus during the workshop.”

This combination of offline and locally accessible technologies makes the model particularly suitable for contexts with limited internet connectivity and infrastructure.

Pedagogical Approach

The OIS model adopts a flexible, learner-centered, and blended pedagogical approach, combining elements of distance education with face-to-face support. Learners can engage with digital content independently, at their own pace, while also participating in structured tutorial sessions facilitated by teachers.

Relevance for VET Contexts

Although primarily focused on secondary education, the OIS model is highly relevant for VET contexts, particularly in environments where access and flexibility are critical. The approach supports:

- blended learning models combining digital and face-to-face instruction;
- flexible access for learners in remote or underserved areas;



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- use of digital resources to complement practical training;

The model demonstrates how OER can be used to expand access, improve quality, and support inclusive education, making it applicable to both general and vocational education systems.

Learning Objectives Developed

Through its integration of digital resources and flexible learning approaches, the OIS model supports the development of a range of skills and competences.

Learners develop:

- subject-specific knowledge aligned with the national curriculum;
- digital literacy skills through interaction with digital content and devices;
- independent learning and time management skills;

At the same time, teachers enhance their digital pedagogical competences, learning how to integrate technology into teaching and support learners in blended environments.

Nigeria – Open Educational Resources and Best Practices in VET

OER: NBTE ODFeL

Overview and Purpose

The [NBTE Open, Distance and Flexible e-Learning](#) (ODFeL) OER Repository, developed by the National Board for Technical Education in partnership with the Commonwealth of



source: [Home | National Board for Technical Education](#)

Learning (CoL), represents a strategic national initiative aimed at expanding access to Technical and Vocational Education and Training (TVET) in Nigeria.

The platform serves as a centralized digital hub providing a wide range of openly accessible resources, including National Occupation Standards (NOS), quality assurance, resources for capacity building of TVET instructors/teachers, resources for e-learning (on-line courses and training modules), learner guides, lecture notes, policy



documents and assessment tools, making vocational learning accessible to a broader population, including those in remote or underserved areas.

By promoting open and distance learning, the initiative contributes to addressing key challenges in the Nigerian TVET system, such as limited access to quality training, the need for industry-aligned skills, and the growing demand for digital and flexible learning opportunities. It also supports capacity building for trainers and institutions, ensuring that teaching practices evolve alongside technological and economic changes.

Digital Tools and Technologies Used

The ODFeL repository integrates a range of digital tools and technologies designed to support flexible and accessible learning. These include:

- Learning Management Systems (LMS) for structured course delivery and learner tracking;
- video conferencing platforms such as Zoom, Google Meet, and Microsoft Teams for synchronous learning;
- mobile learning applications and mobile phone access, enabling learning anytime and anywhere;
- digital libraries and downloadable materials (e.g., PDFs, training manuals);
- communication tools, including discussion forums and email;
- assessment and feedback tools to monitor learner progress and performance.

These technologies ensure that the platform is accessible across different devices and connectivity conditions, supporting inclusive and scalable learning.

Pedagogical Approach

The ODFeL initiative is grounded in a competency-based and learner-centered pedagogical approach, focusing on the development of practical skills and measurable learning outcomes. Rather than emphasizing theoretical knowledge alone, the approach prioritizes the ability to apply skills in real-world vocational contexts where learners can learn at their own pace and still engage in practical sessions.



Relevance for VET Contexts

The ODFeL OER is highly relevant for TVET systems, particularly in contexts where access, flexibility, and scalability are critical. It supports:

- blended learning environments, combining school-based and work-based learning;
- flexible delivery across formal and non-formal education contexts;
- capacity building for trainers and institutions;
- alignment with national occupational standards and industry needs.

The platform is particularly valuable for VET trainers, learners, institutions, policymakers, and employers, as it provides a shared resource base that enhances the quality, consistency, and accessibility of vocational training.

Learning Objectives Developed

Through its comprehensive and competency-based design, the ODFeL repository supports the development of a wide range of skills essential for modern vocational education.

Learners will be able to access and use free learning materials for study independently and flexibly, effectively use digital tools, collaborate online, and apply vocational knowledge confidently in real-world contexts.

Trainers will be able to design and deliver flexible courses, engage learners online, monitor their progress, and integrate digital tools and open resources to improve their instructional practices.

They will also be able to align teaching with industry needs.

Best Practice: Yaba ODFeL

Overview, Purpose

The Open, Distance, Flexible, and eLearning (ODFeL) Initiative, implemented by [Yaba College of Technology](#), Lagos through its Centre for Open, Distance, Flexible and e-



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Learning (CODFeL), represents a significant advancement in making vocational education more inclusive, flexible, and accessible in Nigeria.



Source: [Yaba College of Technology](#)

The initiative combines 70% online instruction with 30% in-person practical sessions. It uses a Learning Management System and virtual communication tools to support various learning styles, making it especially suitable for those unable to attend traditional full-time classes.

This approach enables learners who cannot access conventional classroom setting to enrol in programmes remotely, allowing them to balance other commitments while acquiring essential practical skills, without the need to relocate.

The objectives are to expand access to vocational education, providing learners with flexible opportunities to balance study with work and personal commitments. It ensures that students acquire both theoretical knowledge and practical skills through blended learning, while promoting the use of digital tools and online resources. The programme also supports continuity of learning during disruptions and fosters lifelong learning opportunities for adult learners and working professionals

Learning Context and Digital Solution

The ODFeL programme at Yaba College of Technology, Lagos, which is operated as the Centre for Open, Distance, and Flexible and e-Learning (CODFeL), provides inclusive, seamless access to education using technology-driven platforms. CODFeL supports learners who cannot access conventional classroom settings by offering flexible learning opportunities, online programmes, professional development courses, and innovative training modules.

The blended structure combines online instruction (70%) with physical/face-to-face practicals and examinations (30%), thus ensuring learner-centred and technology-enhanced TVET education. VET learners engage with the core curriculum online and attend practical sessions on campus. The model uses a dedicated e-learning portal through which students can access coursework, lecture materials and online assessments by logging in at their own schedule and interacting with the content. There is an expanded internet facility on campus to support digital learning. The initiative/approach is flexible and addresses the barrier of geographical location/distance and time constraints for learners who are working or in distant places and are unable to



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relocate or who have other commitments, allowing flexible pacing and study periods. The programme enhances the institution's ability to engage students through lectures beyond the classroom while also developing trainers' digital skills.

Evidence of Success and Lessons Learned

The initiative has been successfully adopted by multiple VET institutions and across various disciplines, demonstrating the scalability of flexible, practice-oriented, ICT-based learning models. It has enhanced learners' access to more engaging, learner-centered approaches and strengthened the integration of digital tools into teaching and learning. Additionally, it has contributed to the continuous professional development of educators, improving their digital competences and instructional practices.

The implementation of the initiative highlighted the importance of a clear and supportive policy framework in ensuring the quality, consistency, and long-term relevance of digital learning. At the same time, investing in the continuous professional development of staff proved essential, as it enhanced educators' confidence and ability to integrate digital tools meaningfully into their teaching practice.

Transferability and Scalability

The ODFeL model is highly transferable and scalable, offering a practical solution for expanding access to vocational education in diverse contexts. Its blended structure and reliance on digital platforms make it adaptable to different institutional capacities and learner needs.



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ANNEX I

DIGIBIOVET Questionnaire for the field research on digital competences of TVET trainers in Sub-Saharan Africa (SSA) partner organizations

Introduction

This questionnaire is part of the EU Erasmus+ CBVET project: Digital Ecosystems in Biodiversity: Enhancing Vocational Education and VET Quality Assurance (DIGIBIOVET) and aims to better understand the digital literacy levels, practices, and development needs of TVET trainers and training staff from partner and associated organizations in Sub-Saharan Africa. Your responses will contribute to the design of targeted, context-sensitive capacity-building activities and support the overall



improvement of inclusive and high-quality VET provision. The questionnaire consists of a series of reflective competence statements that allow you to take a snapshot of your current digital competence. All competence statements are rated using the same 7-point developmental scale. Please select the option that best reflects your current level of practice:

1. I am not aware of this competence
2. I am aware (knowledge only)
3. I have tried (limited experimentation)
4. I use it (regular functional use)
5. I analyze and select strategically (critical, context-fit, ethical choices)
6. I support colleagues (mentoring, guidance, re-design of practices)
7. I contribute at organizational level (initiate strategies, policies, design and sharing of innovative teaching)

Participation is voluntary, and the questionnaire takes approximately 15-20 minutes to complete.

All responses will be treated with strict confidentiality and analyzed only in aggregated and anonymized form. No individual participant or organization will be identifiable in any reports or publications.

Section A. Background Information

Q No.	Question	Response Type	Answer Options
1	Please select the country where you currently work or mainly deliver training activities	Single choice	Ethiopia; Mozambique; Madagascar; Malawi; Nigeria
2	Please indicate your professional role	Single choice	VET/TVET Trainer or Instructor; VET/TVET Practitioner
3	How many years of experience do you have as a VET trainer or practitioner?	Single choice	<1 year; 1–3; 4–7; 8–15; >15



CORE AREA 1: Professional Engagement

Q No.	Competence Area	Question	Scale
4	Organizational communication	Using digital technologies to enhance communication with colleagues and/or learners	1–7 Likert
5	Online learning environments (data management & ethics)	Managing online learning environments while considering ethics, privacy, access policies, and responsible data management.	1–7 Likert
6	Professional collaboration	Using digital technologies to collaborate and interact with colleagues and other education or training stakeholders.	1–7 Likert
7	Digital technologies & infrastructure	Using available digital technologies (devices, platforms, software) and infrastructure (internet access, local networks) in my institution or training context to enhance education and training.	1–7 Likert
8	Reflective practice	Reflecting on my own and collective professional practice through the use of digital technologies (e.g. online self-reflection tools, digital reflection diaries, peer-to-peer reflection).	1–7 Likert
9	Digital life	Contributing positively and ethically in the digital world, considering safe and responsible digital practices (e.g. privacy, personal data, bullying, misinformation)	1–7 Likert



Q No.	Competence Area	Question	Scale
10	Professional learning (through digital tech)	Using digital technologies for your own professional learning (e.g., online courses, communities, repositories).	1–7 Likert
11	Professional learning (about digital tech)	Engaging in professional learning activities to develop your digital competence (e.g., training on pedagogical use of digital tools).	1–7 Likert

CORE AREA 2: Digital Resources

Q No.	Competence Area	Question	Scale
12	Searching & selecting resources	Using searching and selection criteria to identify digital resources for teaching and learning (e.g. <i>by following a link, using keywords in a search engine, filtering resources in online repositories</i>)	1–7 Likert
13	Creating digital resources	Creating digital resources that support and enhance teaching and learning aims (e.g. <i>digital text, images, photos, audio, video</i>)	1–7 Likert
14	Modifying resources (copyright and licensing)	Modifying existing <i>digital resources</i> to support and enhance teaching and learning aims, respecting <i>copyright</i> and licensing rules (e.g. <i>adding a picture to text, adding new content, editing a presentation</i>)	1–7 Likert
15	Managing digital content	Organizing digital content, enabling easy and secure access for learners and colleagues, while protecting sensitive and personal data.	1–7 Likert
16	Sharing digital resources	Sharing digital content with respect to intellectual property and copyright rules	1–7 Likert



Q No.	Competence Area	Question	Scale
		(e.g. citing author's name, link to original source).	

CORE AREA 3: Teaching and Learning

Q No.	Competence Area	Question	Scale
17	Teaching with digital technologies	Designing, developing and supporting learning with digital technologies to enhance learning outcomes. (e.g. software programs, mobile apps and tools, on-line and cloud-based resources, peer and self-assessment, e-portfolios).	1–7 Likert
18	Guidance, feedback & reflection	Using digital technologies in order to provide feedback and opportunities for reflection, leading to readjustment of teaching and learning practices for both teachers and learners.	1–7 Likert
19	Collaborative learning	Using digital technologies to foster learner collaboration for individual and collective learning.	1–7 Likert
20	Self-regulated learning	Using digital technologies to enhance students' self-regulated learning processes, fostering active and autonomous learning making students more responsible for their own learning, thereby shifting the focus from teaching to learning.	1–7 Likert
21	Emerging technologies (ethical use)	Using emerging technologies (e.g., AI, VR, simulations, robotics) ethically to explore novel learning experiences and content.	1–7 Likert

CORE AREA 4: Assessment



Q No.	Competence Area	Question	Scale
22	Assessment strategies	Using digital technologies to support formative and summative assessment of learning.	1–7 Likert
23	Analyzing evidence	Using digital technologies to collect and analyze evidence on students' learning processes and outcomes.	1–7 Likert
24	Feedback & planning	Using digital technologies to provide feedback to learners and support planning of further action.	1–7 Likert

CORE AREA 5: Empowering Learners

Q No.	Competence Area	Question	Scale
25	Accessibility & inclusion	Ensuring access to digital resources and learning activities for all learners, considering contextual, physical or cognitive barriers(e.g. <i>limited access to digital devices and/or to Internet connection, learning difficulties</i>).	1–7 Likert
26	Differentiation & personalization	Using digital technologies to address diverse learning needs, enabling different speeds/levels and individual pathways.	1–7 Likert
27	Active engagement	Using digital technologies to foster learners' active and creative engagement in learning.	1–7 Likert
28	Blended learning	Using digital tools, online environments and platforms to ensure learning within and beyond the classroom (blended/distance learning).	1–7 Likert

CORE AREA 6: Facilitating Learners' Digital Competence



Q No.	Competence Area	Question	Scale
29	Information & data literacy	Incorporating learning activities that require learners to search, evaluate, manage and interpret information and data in digital environments.	1–7 Likert
30	Communication & collaboration	Implementing learning activities that require learners to communicate and collaborate using digital technologies (respecting norms and diversity).	1–7 Likert
31	Content creation	Incorporating learning activities that require learners to express themselves by creating and modifying digital artefacts.	1–7 Likert
32	Safety & wellbeing	Empowering learners to use <i>digital technologies</i> safely, while mitigating risks to ensure physical, psychological and social well-being.	1–5 Likert
33	Responsible use	Empowering learners to use digital technologies responsibly and ethically, managing digital identity, footprint and reputation.	1–7 Likert
34	Problem solving	Incorporating learning activities where learners use digital technologies to understand problems and develop solutions (including creativity and innovation).	1–7 Likert