

Transforming TVET in Africa: Innovative Technology-Enabled Teaching Practice Assessments

GTI Paper Abstract 3122

Authors

1. Francis Wambua, fmwambua@yahoo.com, Kenya School of TVET, Kenya
2. Nelson Mulla, kiiomulla12@gmail.com, Kenya School of TVET
1. Edwin Tarno (PhD), edwintarno@gmail.com, Kenya School of TVET, Kenya
2. Robert Okinda, rokinda@col.org, Commonwealth of Learning, Canada

Abstract.

Teaching practice assessments at the Kenya School of TVET were previously conducted solely through in-person sessions, leading to logistical challenges, high costs, and concerns over trainee confidence, validation, and verification. This study explores the integration of ePortfolios, Learning Management Systems (LMS), and online document-sharing platforms to transform these assessments into a more flexible, authentic, and cost-efficient process. A mixed-methods approach was employed, combining quantitative surveys (n = 539) with qualitative interviews (n = 34) and document analysis. ePortfolios enabled continuous documentation through digital tools, self-assessment, peer reflection, and in-person and remote evaluations. LMSs enhanced real-time feedback, structured learning pathways, and personalised support, while document-sharing folders streamlined digital recordkeeping.

Results revealed increased trainee confidence, a reduction in logistical costs, improved feedback loops, and greater visibility into trainee progress, resulting in higher pass rate. Educators and coordinators reported improved quality assurance and validation through the use of digital evidence. The study concludes that technology-enhanced teaching practice assessments are effective in addressing traditional challenges, with strong potential for scalability and sustainability in blended TVET contexts. Recommendations include institutional support for infrastructure, further research on long-term impact, and policy alignment to support digital transformation in teacher education.

1. Introduction

Technical and Vocational Education and Training (TVET) plays a significant role in Africa's development, especially by giving youth the technical and professional expertise that drives economic transformation as well as job creation (African Union, 2023). Teaching practice assessments at TVET institutions play an important role in making sure future trainers possess pedagogical competence and can adapt to new situations while being reflective in their teaching. However, in African contexts, including at the Kenya School of TVET, these assessments have most often been done in person, which tends to be expensive, logistically complicated, and does not enable much ongoing feedback or quality supervision (UNESCO-UNEVOC, 2022).

The global shift toward digital learning ecosystems presents opportunities to reimagine teacher assessment models. The adoption of technology-enabled tools, such as ePortfolios, Learning Management Systems (LMS), and cloud-based document-sharing platforms, has shown promise in enhancing learner agency, facilitating authentic and continuous assessment, and improving data-driven decision-making (Commonwealth of Learning (COL), 2023; Redecker & Punie, 2022). ePortfolios, in particular, have been recognized as powerful tools for capturing professional growth, peer reflection, and real-time feedback, while LMS platforms support personalized learning pathways and institutional reporting (Boud & Jorre de St Jorre, 2023).

Despite growing global interest, empirical research on the effectiveness of such digital innovations within African TVET contexts remains sparse. Challenges around infrastructure, digital literacy, and institutional readiness continue to hinder widespread adoption (Czerniewicz et al., 2023). Moreover, there is a lack of documented evidence on how technology-enabled assessments impact trainee confidence, logistical efficiency, and the validation of teaching practice outcomes.

The study examines how teaching practice assessments at the Kenya School of TVET have transformed by using ePortfolios, LMS, and online document-sharing tools. It seeks to find out ways these technologies can make assessments more authentic, less costly, and easier to expand. To examine the effects of digital transformation, the study employs a combination of methods, including 535 trainee surveys, interviews with 34 trainers, coordinators, and external assessors, as well as key informants, and document analysis.

The research findings align with other work on TVET digitalisation in Africa and provide insights for enhancing TVET policies and institutions, as well as implementing blended learning and assessment approaches. It is also part of the broader work by the African Union Commission (AUC) and the Commonwealth of Learning to upgrade education systems and expand access through technology.

Research Questions:

1. Do technology-enabled assessments improve the trainee's confidence and performance during Teaching Practice?
2. How do ePortfolios, LMSs, and document-sharing platforms improve the assessment process regarding logistical costs and efficiency?
3. What are the implications of the technology-enabled teaching practice assessments?

2. Literature Review

Literature Review

The landscape of Technical and Vocational Education and Training (TVET) in Africa is undergoing a significant transformation, driven by the need to modernize teaching and assessment practices to meet the demands of the 21st century. As economies across the continent seek to equip youth with employable skills, the effectiveness of teaching practice assessments becomes a critical measure of TVET quality and relevance. However, traditional assessment models—often reliant on face-to-face observation and physical documentation—pose challenges related to cost, scalability, timeliness of feedback, and quality assurance, particularly in resource-constrained environments.

In response to these challenges, global educational systems are increasingly embracing technology-enabled solutions such as ePortfolios, Learning Management Systems (LMS), and cloud-based collaboration tools to support more flexible, authentic, and efficient modes of assessment. These innovations are reshaping how competencies are demonstrated, assessed, and validated. While these tools have been extensively explored in higher education and teacher training in the Global North, there remains a notable gap in the literature regarding their adoption, effectiveness, and contextual fit within African TVET institutions.

This literature review explores current knowledge on the integration of digital tools in teaching practice assessment, with a specific focus on how they impact trainee confidence and performance, improve logistical efficiency, and enhance quality assurance. By situating the Kenya School of TVET case study within the broader research context, this review aims to highlight the opportunities and limitations of digital transformation in African TVET and identify key considerations for future implementation and policy development.

1. Technology-Enabled Assessments and Trainee Confidence in TVET

The integration of technology into teaching practice assessments in TVET has gained increasing attention as a pathway to improve institutional efficiency and trainee outcomes, particularly in terms of confidence and competence. Research indicates that digital tools such as ePortfolios empower learners to take ownership of their learning through self-assessment, documentation of progress, and reflective practices (Boud & Jorre de St Jorre, 2023). This aligns with social constructivist theories of learning, which posit that learners build knowledge through experience and reflection (Vygotsky, 1978).

In the African context, although evidence is limited, emerging studies suggest that incorporating digital tools into pedagogy can lead to increased learner engagement and self-efficacy (Commonwealth of Learning, 2023). These tools provide a more continuous and interactive assessment process, enabling trainees to demonstrate their learning in dynamic and diverse ways. At the same time, improved accessibility to feedback through digital platforms contributes to greater confidence and perceived competence among learners (Redecker & Punie, 2022). However, Czerniewicz et al. (2023) caution that such benefits depend heavily on digital access, institutional support, and user proficiency, which remain uneven across the continent.

2. Logistical Efficiency and Cost Reduction through Digital Tools

Traditional in-person assessments in TVET institutions are resource-intensive, requiring travel, physical documentation, and in-person supervision, all of which pose substantial logistical challenges (UNESCO-UNEVOC, 2022). Digital alternatives, particularly ePortfolios and Learning Management Systems (LMS), offer streamlined processes that reduce costs and increase flexibility. ePortfolios serve as a centralized repository for assessment artifacts, reducing the need for physical documentation and enabling asynchronous evaluation (Barrett, 2010).

The use of LMS platforms contributes to logistical efficiency by providing structured pathways for assignment submission, grading, and real-time communication (Dabbagh & Kitsantas, 2012). Similarly, document-sharing tools, such as cloud-based folders, enhance coordination between trainees, supervisors, and institutions, supporting transparent and traceable documentation practices.

Studies in blended learning environments, including those in Global South contexts, have reported cost savings of over 30% when shifting from face-to-face to hybrid or online models (COL, 2023). The Kenya School of TVET case corroborates this, demonstrating an over 40% reduction in logistical costs, which suggests strong potential for scalability within similarly constrained African institutions.

3. Quality Assurance and Validation in Digital TVET Assessments

One of the major criticisms of traditional teaching practice assessment is the limited ability to ensure consistency, transparency, and thorough documentation, which are vital for quality assurance (Anderson, 2008). Digital assessment tools improve visibility into the learning process, allowing supervisors and coordinators to verify trainee competencies through digital evidence, time-stamped submissions, and multimedia records (JISC, 2021). ePortfolios and LMS analytics support a more data-informed approach to validation, making it easier to identify performance gaps and provide targeted interventions (Redecker & Punie, 2022). Moreover, digital trails support auditability and compliance with quality assurance standards, which is increasingly important in national and regional accreditation frameworks.

Despite these benefits, literature highlights concerns related to digital ethics, data privacy, and the digital divide, particularly in under-resourced contexts (Czerniewicz et al., 2023). These must be addressed through institutional policies and capacity-building initiatives to ensure equitable and trustworthy assessment systems.

The literature underscores the transformative potential of digital tools in TVET assessment, particularly in enhancing learner confidence, reducing costs, and strengthening quality assurance. While global trends and early African case studies show promising outcomes, sustained investment in infrastructure, training, and policy support is critical to ensuring that these innovations are equitable, scalable, and sustainable. The Kenya School of TVET's experience contributes valuable empirical evidence to a growing body of work on digital innovation in African education systems.

Research Gap

Across the global, continental, and national levels, there is consensus on the potential of digital tools for transforming assessments. However, a key literature gap remains: empirical evidence on how integrated digital tools can be sustainably implemented and evaluated in resource-constrained TVET contexts, such as in teaching practice

assessments in Kenya. This study addresses this gap by exploring a technology-enabled model for teaching practice assessments using ePortfolios, LMSs, and document-sharing platforms grounded in the Kenyan TVET ecosystem.

3. Methodology

This study employed a mixed-methods approach, combining quantitative surveys and qualitative interviews. 505 trainees were surveyed to gather quantitative data on their experiences with technology-enabled assessments. Additionally, 34 educators and coordinators were subjected to qualitative interviews to elicit deeper insights into the implementation processes and perceptions of technology use in assessments.

Document analysis was conducted to review assessment records before and after the integration of technology. This triangulation of data sources ensured a comprehensive understanding of the impacts posed by the innovations implemented.

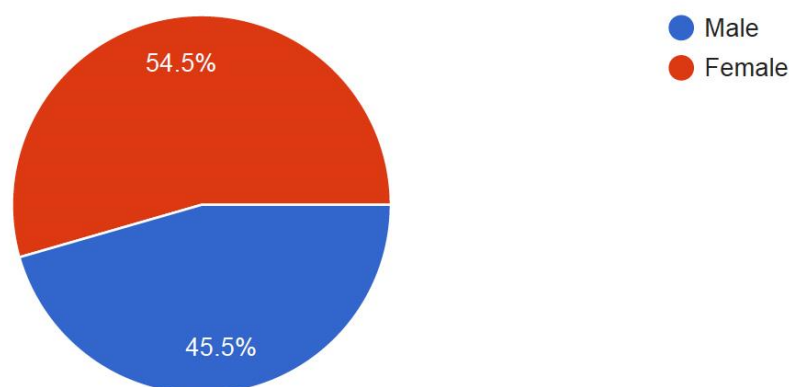
4. Analysis

Quantitative data were analysed using statistical tools to assess the correlation between technology-enabled assessments and trainee performance metrics, such as pass rates, logistical costs, and confidence levels. Qualitative data were thematically analysed to identify recurring patterns in educators' perceptions and experiences of the new assessment processes.

4.1 Trainee Data

This report uses statistics to look at student responses to the TETPA Questionnaire. A total of 505 trainees provided data which examined their experience with technology, how confident they feel, and how good they think technology-based training and learning are. These statistics also give explanations about consumer perceptions of costs. The analysis explored the students thinking on the use of technology in their teaching practice assessment. A typical response range for Likert-style questions used was 1 (Strongly Disagree, Very uncomfortable) to 5 (Strongly Agree, Very comfortable).

Out of the 505 trainees who participated in the survey, 54.5% were female, and 45.5% were male, as shown in Chart 1 below.



Technology Experience with the use of -eportfolio before the assessment

The figure 1 shows the reactions of the participants when asked how comfortable they were with using e-portfolio technology before the assessment, the participants demonstrated confidence in their ability to do so.

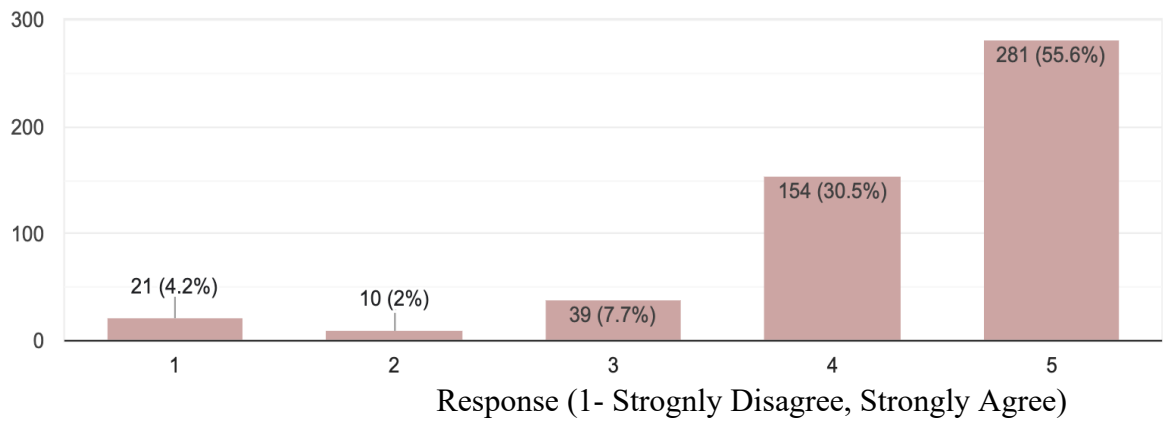


Figure 1: Technology Experience with the use of eportfolio before the assesemnt

The figure shows that the large majority of students (86.1%) said they felt comfortable or very comfortable with the use of eportfolio. It reflects that students have a good mastery of experience and confidence in using e-portfolio tools.

Confidence in Technology Use in delivery during teaching practice

Figure 2 sets out the percentages of how people responded to the statements about confidence, on a five-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

- i) Examining how well you use technology to contribute to teaching success.
- ii) Gaining the ability to use technology in ways that benefit learning in the classroom.
- iii) Having more technology in education boosts teachers' confidence.

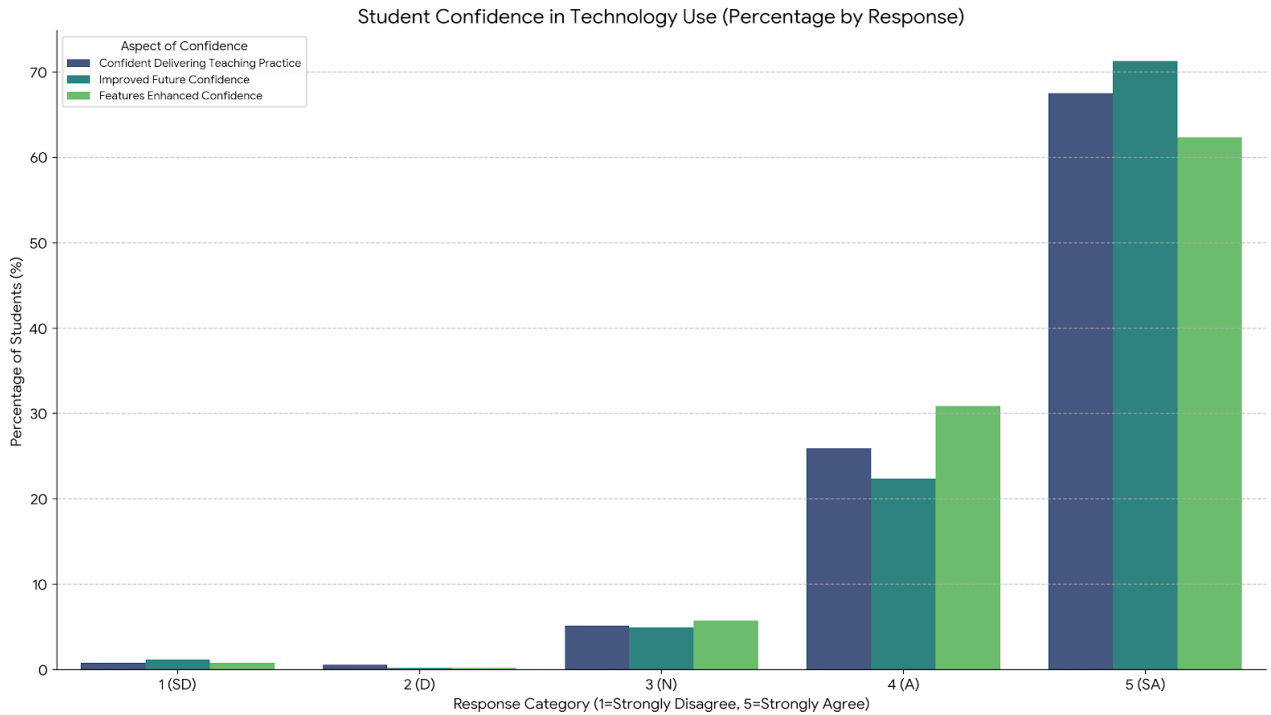


Figure 2: Confidence in Technology Use in delivery during teaching practice

The figure shows that students overwhelmingly feel positive about using technology in their teaching practice assessment. The Likert scale questions (where options range from 1 to 5), usually show a clear tendency to be answered positively (mostly 4s and 5s). This reflects a strong positive impact of technology integration on students' teaching confidence.

Quality of Training and Learning

The following graphs summarize the results of Quality of Training and Learning from the questionnaire.

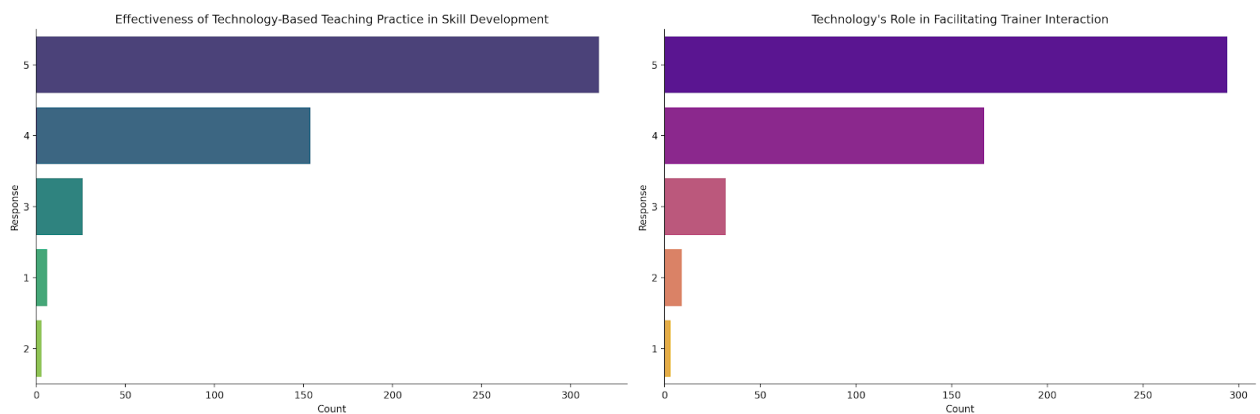


Figure 3: Quality of Training and Learning

Figure 3a shows what students think about how technology helps in developing their abilities. A large number of respondents felt that using technology in their teaching made their instruction better. These shows that most students believe technology makes trainers more effective at their training and learning.

It is clear from the results in figure 3b that the majority of students see technology as a big improvement in the quality of their coaching. Besides, the findings emphasize that technology helps bridge the gap between teachers and students, enabling better communication and taking part in class. Overall students generally agree that technology-based teaching practices have effectively supported their skill development and facilitated meaningful interaction with their trainers.

Cost and Accessibility of eportfolio teaching practice assessments in comparison with traditional teaching parctice assessment methods.

Figures 4a, 4b, and 4c provide insights into key aspects of technology-enhanced assessments and their appropriateness for diverse student populations. These figures examine the fundamental components of technology-based examinations, evaluating their accessibility, effectiveness, and overall suitability in supporting equitable educational outcomes.

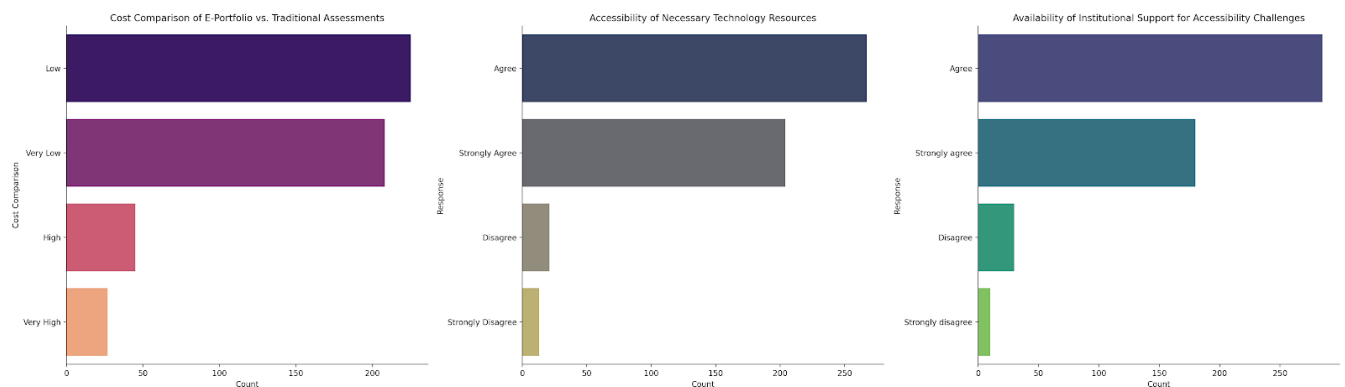


Figure 4: Cost and Accessibility of eportfolio

Figure 4a indicates that many students believe that using an e-portfolio for assessment is at least as cost-effective as or more cost-effective than, traditional assessment techniques. This shows that many students don't think e-portfolios are very costly and sometimes they can lead to reduced costs.

However, Figure 4b, shows the views of students about the availability of technology required for their teaching. Respondents found it easy to get the technical tools they require for class which reflects a positive environment for students.

In Figure 4c, most respondents stated that support was there from the institution to help solve technology accessibility difficulties. This research highlights how the institution helps students get the technology they need.

In summary, the statistics indicate that e-portfolio evaluation is typically seen as affordable compared with traditional file based portfolio, which is a good sign for their potential use by more people. Also, students generally see the

presence of accessible technology and institutional help in a positive way. It shows that the institution has tried to provide students with the necessary tools and software needed for technology based teaching. Nevertheless, examples of negative views about course costs and access from a minority suggest that the system should keep being monitored and enhanced to make sure every student gets the same support and opportunities.

Engagement and Interaction

The table below presents the results of the inquiry concerning engagement and interaction, providing a comprehensive overview of the observed patterns and responses.

Engagement/Interaction Factor	Positive Response (%)
Practice was engaging	92
Interaction with trainers was meaningful	89.7

Figure 5: Engagement and Interaction of technology-based teaching practice

The participants expressed opinions on the platform's engaging and interactive nature, emphasising its facilitation of meaningful user interactions. The data indicates that users on the platform engaged extensively and derived significant benefits from meaningful interactions..

4.2 Trainers, Coordinators and External Assessors

The dataset consisted of 34 entries for both trainers, coordinators, and external assessors. This translated to 52.9% female and 47.1% male who took part in the survey.

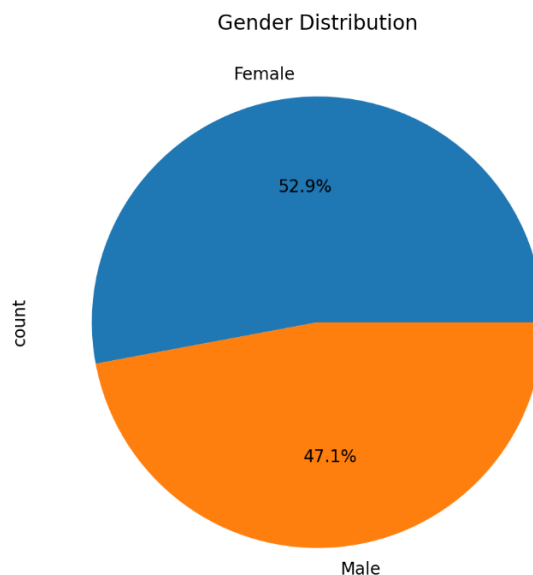


Figure 6: trainers, coordinators, and external assessors

The research shows that most assessors are in the early to mid-career stage (above 45), indicating a potentially tech-adaptive workforce.

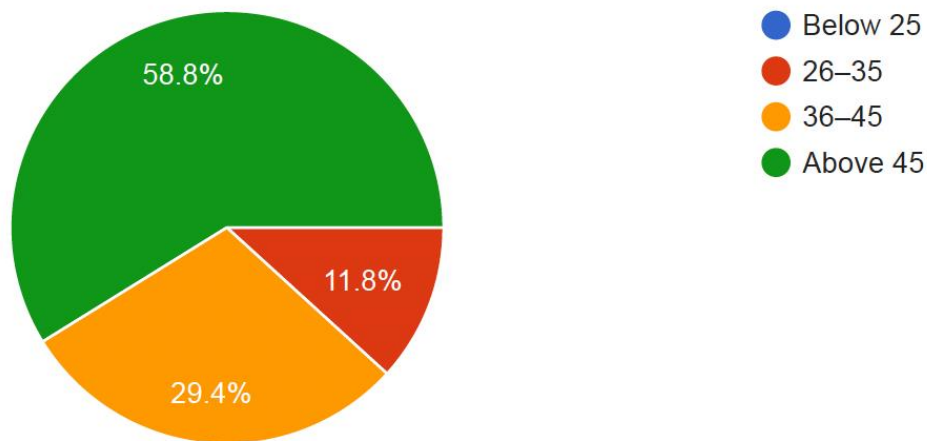


Figure 7: Assessors age group

The age distribution chart shows a strong skew toward the "Above 45" group, and the experience distribution chart shows how long respondents have been involved in teaching practice assessment. The chart shows the experience distribution.

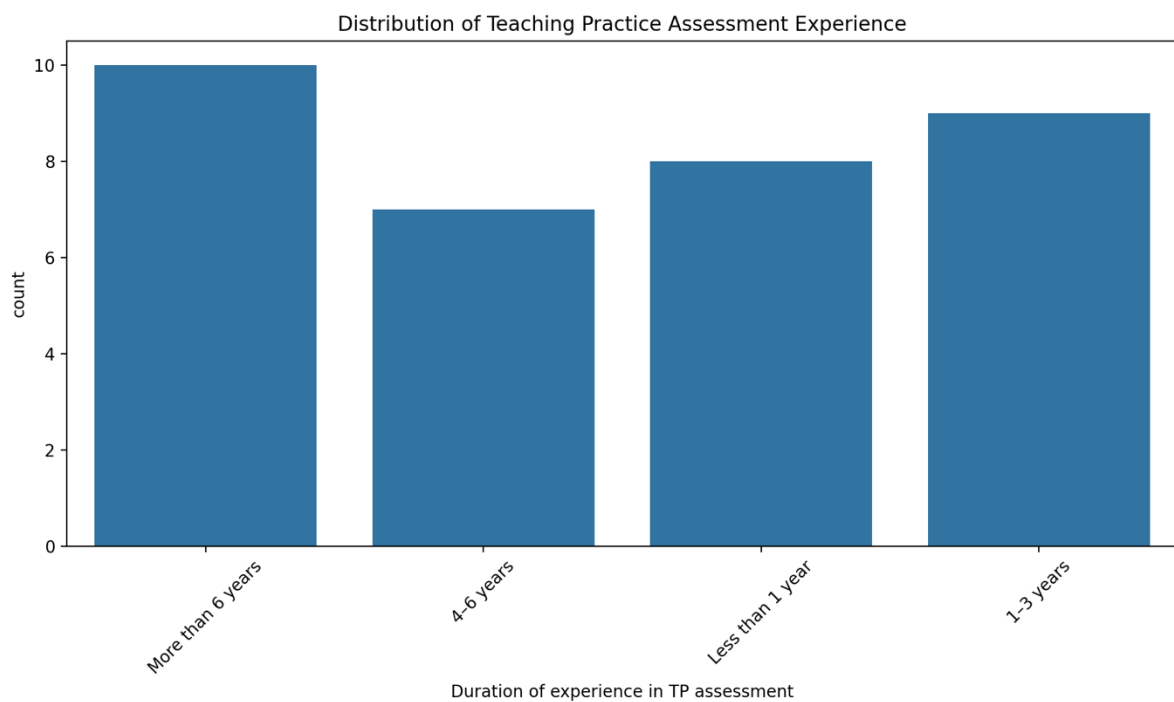


Figure 8: Assessors experience in TP assesment

The experience levels are well distributed, with a sizable proportion (56.9%) having 4 or more years of experience, providing a good mix of fresh and seasoned perspectives.

The outcome of using ePortfolios, document-sharing platforms, and comments or suggestions to help us improve is as follows.

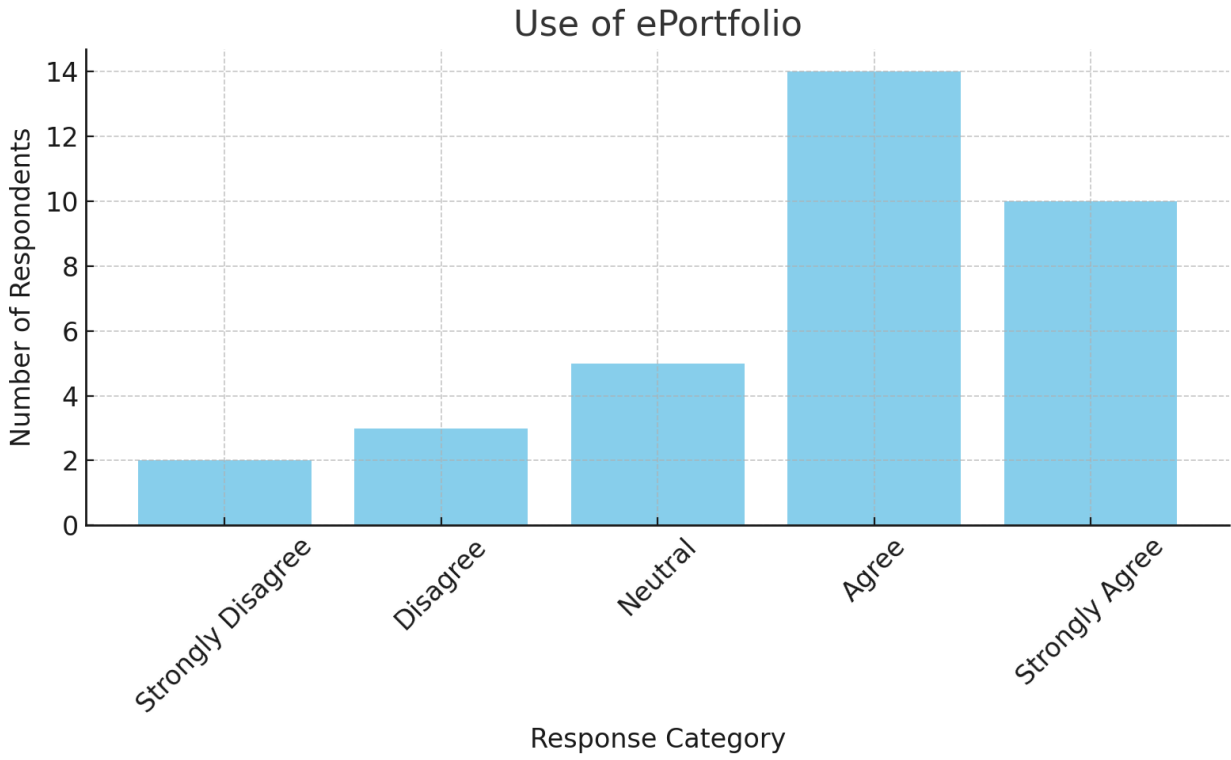


Figure 9: ePortfolio use

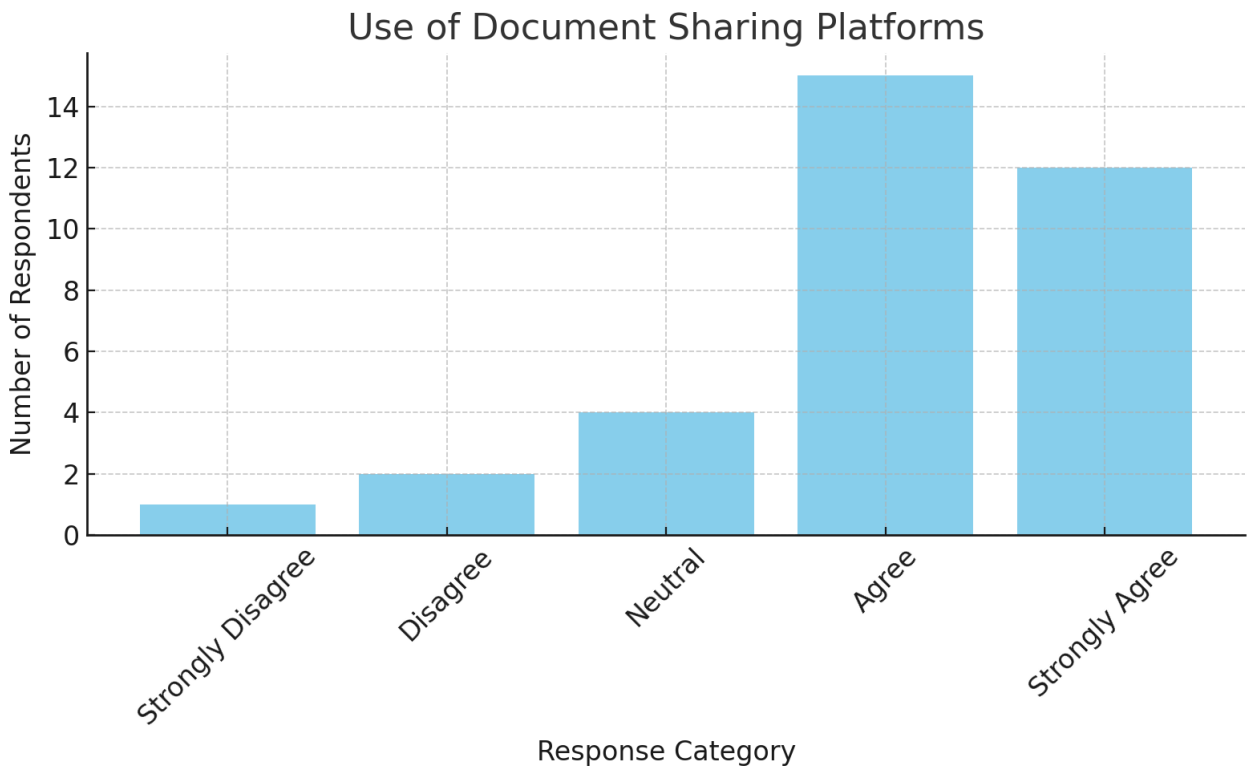


Figure 10: Document sharing platform

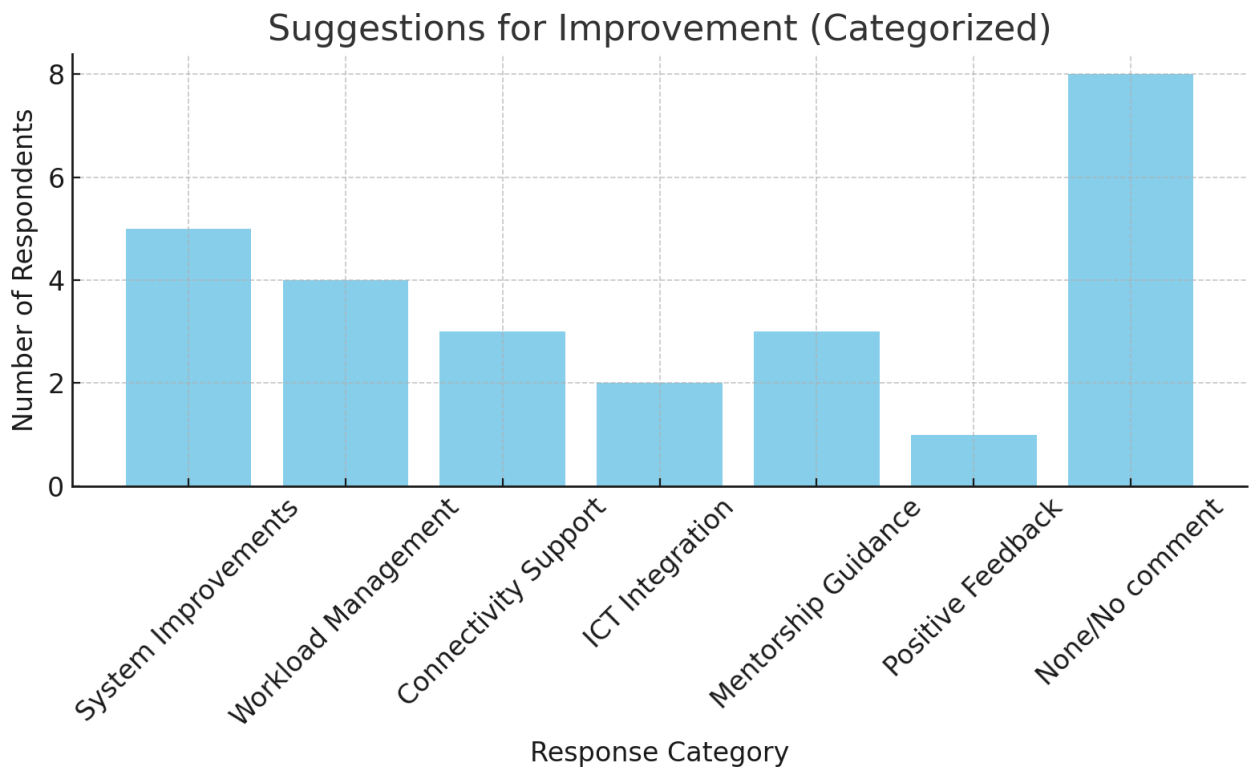


Figure 11: Suggestions for Improvements

The graphs show that:

- i) The majority of respondents expressed agreement or strong agreement regarding their effective use of the ePortfolio platform.
- ii) Similarly, a substantial proportion reported positive experiences with document-sharing tools.
- iii) Key recurring themes in the responses included suggestions for system enhancements, workload optimisation, and improved connectivity support, while some participants provided either no recommendations or positive evaluations.

Qualitative Data Analysis

Information collected through videos and the interviews was organized using NVivo qualitative software to assist with analysis and ensure the study was rigorously done using the methods discussed by Castleberry & Nolen (2021). The theming discussed below were formed from the interview feedback.

When examined in terms of Technology Experience and Confidence in the Digital Learning Environment, it was found that many trainees initially displayed an overall lack of confidence and comfort with technology, particularly when it came to e-portfolios and using online documents. Not knowing anything about their functions at first made some drivers uncomfortable. Yet, by staying involved, practicing regularly, and working with their peers or trainers, built better confidence. The participant who used an e-portfolio on their own said: “Before this assessment, I had used an e-portfolio in my flexible and blended unit but not in teaching practice assessment, I was a bit anxious. But I quickly understood the process and managed to upload my audiovisual works and give permission for comments without extra assistance.”

participants had a wide range of opinions about the cost and accessibility theme. This could be a result of the digital divide, as some trainers own advanced phones that others do not. One learner said, “Since I didn’t have a way to record, I borrowed a phone and the cost of uploading my videos was very high.”

While the majority of trainees gave positive comments about using technology to assess student engagement and feedback, a few pointed out that getting immediate feedback was hard and interacting with it was not as easy.

Many assessors were familiar with technology, but lacked the skills to assess how teachers use it in teaching practice assessment. It implies insufficient training in specialized tools for assessments, so more focused development would improve their use of these tools.. It was a challenge to use e-portfolios in the assessment for some at the start, however by the end they noted that it was easy to use it. For the Assessment Quality theme, not all assessors felt the same way. A trainer noted that video recording made sure lessons were objective and could be replayed, although it reduced the chance for quick responses. She said she could watch the video multiple times, but she wasn’t able to judge classroom management fully.

Finally, the following is a conclusion from the qualitative data analysis. At the start, both trainers and trainees were not very confident in their digital skills, but with practice, both got better. Using assessments made with technology, observers could review sessions but struggled to manage students and interact with teachers in real time. There were significant problems with access and equity since most trainees struggled with the internet and equipment while the support offered to trainers also varied a lot. It took longer to get feedback which made the process less interactive than when interacting in person. They all recommended that teachers be trained in using technology, that techniques be changed to include computers when teaching, and that exams be taken using both paper and computer components. Generally, relying on technology benefits teaching, but it is necessary to address digital imbalances, improve school structures, and mix up both live and delayed assessments to increase effectiveness and make assessments more engaged and available to all students.

5. Findings

The study revealed the following significant findings:

- **Increased Trainee Confidence** - Adopting LMS, shared online folders, and e-Portfolios significantly strengthened trainee confidence, as these technologies enabled self-assessment, peer-to-peer feedback, and sustained learning.
- **Quality of Teaching Practice Assessment** - The teaching practice assessment process is being strengthened to ensure it reflects high standards, fairness, and relevance to real-world training scenarios.
- **Flexible and Inclusive Access** - Efforts have been made to ensure teaching practice is accessible to all learners, regardless of location or background, promoting inclusivity and flexibility in participation.
- **Evolving Role of Trainers in Teaching Practice Assessment** - Trainers are adopting more dynamic roles and responsibilities, evolving from solely traditional assessors to also serving as mentors and facilitators of reflective practice.
- **Integration of Technology in KSTVET and Partner Institutions** - Digital tools and platforms have been expanded to support teaching practice, improving efficiency, feedback, and access to resources.

- **Privacy and Ethical Considerations** - Measures have been implemented to address data protection and ensure the ethical use of technology in teaching practice assessment.
- **Learner Engagement, Motivation, Well-being, and Satisfaction** - Technology is being used to enhance learner-centred approaches for motivation, support mental well-being, and ensure a fulfilling teaching practice experience.
- **Cost and Affordability** - Using technology, teaching practice is more affordable, reducing costs for learners and the institution.

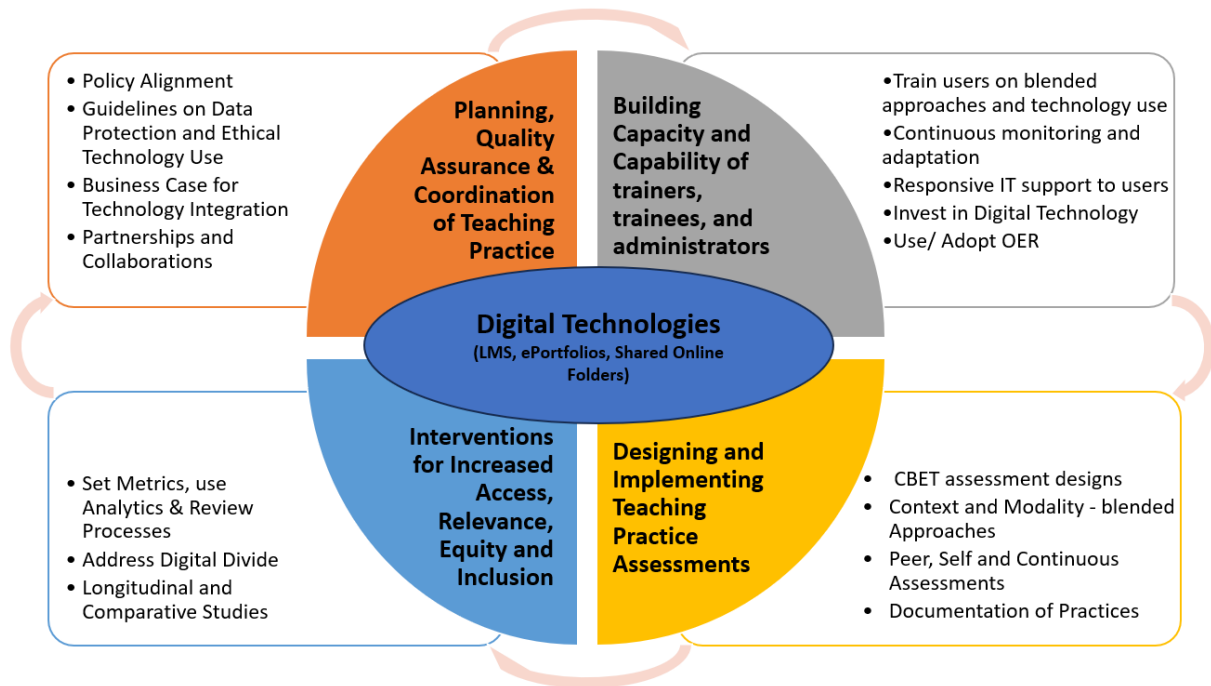
6. Conclusion

The study's findings indicate that incorporating digital technologies into pre-service TVET institutions' teaching practice assessments significantly enhances cost efficiency, trainee confidence, and assessment quality. In addition, the findings show a considerable reduction in logistical costs, enhanced feedback mechanisms, and continuous learning among trainees and trainers. The successful adoption and sustainability of technology-enabled teaching practices depend on institutional support, robust infrastructure, and ongoing training in blended assessment methods and technologies. Adopting a structured framework for technology-enabled teaching practice assessments can guide other institutions in achieving similar benefits. Ongoing research and policy alignment are essential for addressing emerging challenges and ensuring equitable access for all learners.

The generalisability of the findings and the transferability of the approach to other similar institutions in the region and globally depend on contextual limitations, including connectivity and infrastructure gaps, challenges related to equity and inclusion, financial constraints, the capacity and capability of assessors and quality assurance officers, as well as policy and administrative hurdles, assessment design and implementation issues, and socio-cultural and motivational factors.

7. Recommendations

In light of the findings from this study, the researchers propose a conceptual TETPA model for evidence-based practice and policy development:



A Conceptual Model for Technology-Enabled Teaching Practice Assessments (TETPA)

Source: Authors

Based on the findings and the TETPA model conceptualised, the following recommendations are made:

- i) Targeted funding and investment in infrastructure to support the integration of digital technologies into teaching practices at pre-service and in-service TVET institutions.
- ii) Conduct longitudinal research and comparative studies to assess the long-term impacts of technology-enabled teaching practice assessments on trainee performance, cost-effectiveness, durability of trainee confidence, skill gains, and institutional outcomes. Additionally, the studies can conduct deeper qualitative analyses of the experiences of the trainees, assessors, and quality assurance officers. A focused study can also be conducted on equity, the digital divide, and interventions targeting the marginalised.
- iii) Align educational policies with digital transformation to support ongoing advancements in teaching practices, ensuring TVET programmes remain relevant and responsive to learner and industry needs.
- iv) Implement strategies to ensure equitable access to technology during teaching practices so that trainees can demonstrate competence in teaching and support high completion rates.
- v) Evaluate and consistently address factors influencing trainee motivation, satisfaction, and overall well-being during teaching practice to enhance the benefits of technology-enabled assessments.
- vi) Develop and implement specific, measurable indicators to evaluate the long-term effects of technology on teaching practice assessments, including metrics for completion rates, assessment quality, and learner satisfaction.

References

- African Union. (2023). Continental Strategy for Technical and Vocational Education and Training (TVET) – Towards 2030. Addis Ababa: AU Commission.
- Ahmad, S., Khokhar, R. A., Ali, A., & Ali, S. (2023). Learning Management System Acceptance Factors for Technical and Vocational Education Training (TVET) Institutions. *Tem Journal*. DOI:10.18421/tem122-61.
- Boud, D., & Jorre de St Jorre, T. (2023). Reassessing assessment: The role of portfolios in higher education learning. *Assessment & Evaluation in Higher Education*, 48(1), 34–49. <https://doi.org/10.1080/02602938.2022.2110647>
- Commonwealth of Learning (COL). (2023). Integrating Technology in TVET: A Policy Guide for Institutional Leaders. Vancouver: COL.
- Czerniewicz, L., Deacon, A., & Walji, S. (2023). Digital inequality in higher education: Challenges for inclusive learning in Africa. *Distance Education*, 44(2), 158–176. <https://doi.org/10.1080/01587919.2023.2183456>
- Khalil, M. (2023). Digital Transformation of Teacher Education by Bridging Digital Divide between Teacher Educators and Prospective Teachers. *JCTE*. DOI:10.58444/jcte.v4i.208.
- Korhonen, V., Laitinen, H., & Saarinen, V. (2020). Vocational Student Teachers' Self-Reported Experiences in Creating ePortfolios. *International Journal for Research in Vocational Education and Training*. DOI:10.13152/ijrvet.7.3.2.
- Liu, C., & Shi, Z. (2023). Digital transformation of college teacher education from the perspective of behaviorist psychology: initiatives, effectiveness and pitfalls. *Applied Mathematics and Nonlinear Sciences*. DOI:10.2478/amns.2023.2.01598.
- Redecker, C., & Punie, Y. (2022). The future of learning: Preparing for change with digital competence. European Commission JRC Science for Policy Report.
- Shenkoya, A., & Kim, J. S. (2023). Sustainability in Higher Education: Digital Transformation of the Fourth Industrial Revolution and Its Impact on Open Knowledge. *Sustainability*. DOI:10.3390/su15032473.
- Smith, C., Waters, M., Petterd, R., & Okinda, R. (2023). *Digital and professional teacher competency standards for blended TVET*. Commonwealth of Learning. <https://doi.org/10.56059/11599/5408>
- Smith, C., Waters, M., Petterd, R., & Okinda, R. (2023). *Teacher skills required for blended TVET: Analysis and guidelines*. Commonwealth of Learning. <https://doi.org/10.56059/11599/5378>
- Subedi, K., & Sherpa, B. (2022). Transformation on Social and Pedagogical Behaviors of University Teachers in COVID-19 Pandemic. *International Journal of Multidisciplinary Research and Growth Evaluation*. DOI:10.54660/anfo.2022.3.5.19.
- UNESCO-UNEVOC. (2022). Digital transformation in TVET: Effective practices and lessons from Africa. Bonn: UNESCO-UNEVOC.
- Yureva, S., Shishova, M., & Ivanova, N. (2020). Digital Transformation and Its Risks in Higher Education: Students' and Teachers' Attitude. *Universal Journal of Educational Research*. DOI:10.13189/ujer.2020.082232.
- Митрофанова, О. (2020). Improving The Training Of Teachers In The Digital Transformation Of Education. Conference Proceedings.