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### Influence of Formative Assessment Management Techniques on Trainee Academic Performance in National Examinations in TVET Institutions in Western Kenya

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**Keywords:**

Formative Assessment,  
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TVET Institutions.

The study investigated the impact of formative assessment management techniques on trainee academic performance in national examinations within TVET institutions in Western Kenya. Grounded in social cognitive theory, constructivism, and the diffusion of innovation theory, it involved a target population of 406 respondents, including principals, deputy principals, registrars, examination officers, and heads of academic departments across 29 public TVET institutions in the region. Using stratified, purposive and simple random sampling procedures 200 respondents were selected. Data collection was conducted by use of questionnaires and interviews and analyzed by way of descriptive and inferential statistics. The findings revealed strong correlations between effective management techniques and formative assessment scores, underscoring their predictive value for academic success. The study concludes that implementing structured formative assessment management techniques significantly enhances trainee performance in final examinations. It advocates for comprehensive strategies to support trainees, improve learning experiences, and achieve better academic outcomes, emphasizing the critical role of formative assessment management techniques in fostering academic excellence in TVET institutions.

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## INTRODUCTION

The landscape of Technical and Vocational Education and Training (TVET) in Europe is dynamic and evolving, and an examination of the literature reveals key insights into trainee performance within the context of assessment management. A study by Yusop *et al.*, (2022) sheds light on the importance of competency-based assessments in Europe's TVET systems. Competency-based approaches emphasize practical skills and real-world applicability, aligning assessments with industry needs. This not only ensures the relevance of TVET programs but also contributes to higher levels of trainee performance by preparing them for the specific demands of their chosen professions.

The European Centre for the Development of Vocational Training (ECDVT) has been instrumental in highlighting the role of work-based learning in TVET assessment. Work-based assessments, as discussed by Hashim, & Hamidon (2022), provide a bridge between classroom learning and workplace application. Trainees engaging in work-based assessments often exhibit enhanced performance as they directly apply theoretical knowledge to practical settings, fostering a seamless transition to the workforce.

Research by the European Training Foundation as quoted by Mafaralala (2020) emphasizes the impact of digitalization on TVET assessment management in Europe. The integration of digital tools and platforms has not only streamlined assessment processes but has also provided trainees with more interactive and engaging learning experiences. This, in turn, positively influences trainee performance by catering for diverse learning styles and preferences. Moreover, the European Qualifications Framework (EQF) plays a pivotal role in ensuring the comparability of qualifications across European countries. As highlighted by Hashim, & Hamidon (2022), the EQF facilitates a standardized approach to TVET assessment, enabling a more transparent and transferable system. Trainees benefit from this standardization by increased recognition of their qualifications, positively impacting their performance in national and international job markets.

A study by Liu *et al.*, (2020) highlights the role of project-based assessments in Asia's TVET systems. Project-based assessments, focusing on collaborative and practical projects, have been shown to enhance critical thinking and problem-solving skills among trainees. This approach not only contributes to improved performance in assessments but also prepares trainees for the complex challenges they may face in their future careers. The Asian Development Bank's (ADB) publications stress the importance of industry linkages in TVET assessment management. Collaborations between TVET institutions and industries as discussed by Mensah (2020) provide valuable insights into current industry practices and requirements. This industry-relevant approach to assessment ensures that trainees are better aligned with the skills demanded by the job market, positively impacting their performance and employability.

A study by Nyangweso (2022) emphasizes the importance of contextually relevant assessments in African TVET systems. Trainee performance is positively influenced when assessments are designed to align with the socio-economic and cultural contexts of the region. Contextually relevant assessments not only contribute to a better understanding of trainee capabilities but also promote the practical application of skills in local settings. The African Union's Strategy for TVET (AU-TVET) underscores the significance of practical and industry-relevant assessments. Nyangweso (2022) states that AU-TVET advocates for assessments that simulate real-world work environments, allowing trainees to develop skills directly applicable to their chosen professions. This approach enhances trainee performance by bridging the gap between theoretical knowledge and practical application.

Research by Osumbah, & Wekesa (2023) highlights the role of community engagement in TVET assessment management in Africa. Involving local communities in the assessment process not only provides a broader perspective on trainee performance but also strengthens the connection between TVET institutions and the communities they serve. This community-centric approach

positively influences trainee motivation and performance. Moreover, the literature emphasizes the importance of addressing infrastructure challenges in TVET assessment management in Africa. Adequate facilities and resources, as discussed by Erima (2021) are essential for effective assessments. Trainee performance is hindered by poor infrastructure, making it crucial for African countries to invest in the development of TVET facilities.

A study by Erima (2021) highlights the impact of competency-based assessments on trainee performance in East Africa. Competency-based assessments emphasize practical skills and real-world application, aligning closely with the needs of the local job market. This approach has been shown to enhance trainee performance by ensuring that assessments mirror the skills demanded by East African industries. The East African Community's (EAC) efforts in harmonizing education systems play a pivotal role in TVET assessment management. As discussed by Osumbah, & Wekesa (2023) the harmonization aims to standardize curricula and assessments across member states, facilitating smoother transitions for trainees within the region. This standardization positively influences trainee performance by providing a consistent and recognized framework.

Research by Karani, & Waiganjo (2022) explores the importance of industry linkages in East African TVET programs. Collaboration between TVET institutions and industries provides valuable insights into current market demands, ensuring that assessments are tailored to meet the specific needs of employers. This industry-relevant focus contributes to improved trainee performance and increased employability. Furthermore, studies by the Inter-University Council for East Africa (IUCEA) emphasize the role of technology in TVET assessment management. The integration of e-assessments and online platforms, as discussed by Karani, & Waiganjo (2022) IUCEA, offers opportunities for more flexible and accessible assessments. This technological integration positively impacts trainee performance by catering to diverse learning styles and preparing them for the digital demands of the contemporary job market.

A study by Njenga (2022) emphasizes the importance of integrating practical assessments into TVET programs in Kenya. Practical assessments, which evaluate hands-on skills and application of knowledge, have been found to positively influence trainee performance by providing a more comprehensive measure of their capabilities. This aligns with the practical and industry-driven nature of TVET in Kenya. Kenya's Competency-Based Education and Training (CBET) framework has been a focal point in TVET assessment reform. As discussed by Haßler, & Haseloff (2022) CBET emphasizes the acquisition of practical skills and competencies required in the job market. The implementation of CBET aligns assessments with industry standards, positively impacting trainee performance by ensuring relevance and currency of skills. Research by Karani, & Waiganjo (2022) explores the role of continuous assessment in enhancing trainee performance in Kenyan TVET institutions. Continuous assessment, which involves ongoing evaluation throughout the learning process, has been found to contribute to a deeper understanding of subjects and improved retention of knowledge. This approach positively influences trainee performance by promoting a more engaged and sustained learning experience.

### **Statement of the Problem**

Existing literature supports the alignment of TVET assessments with national development priorities which include the Vision 2030 and the Big Four Agenda. During formative assessment in TVET institutions emphasis is placed on practical assessments, competency-based education and training (CBET), continuous assessment, industry linkages and deployment of technology. Despite this, discrepancies are observed between student performance in formative assessments within institutions and summative assessments in national examinations. Results analyzed by the Kenya National Examination Council (KNEC) show a trend that students perform better in formative assessments than in summative assessments annually. Ordinarily, formative assessment should reflect the competencies of trainees as it impacts their performance by fostering a sense of purpose and relevance in their education. Performing well in

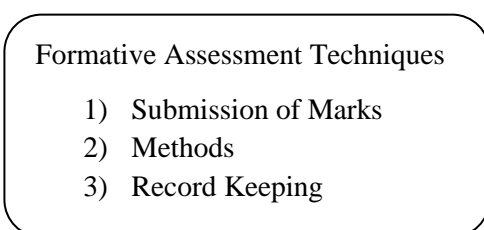
formative assessment and poorly in summative assessment casts doubt on the effectiveness of their training and readiness for the job market which undermines the realization of the broader national development goals of the country. Based on this shortcoming, this study sought to understand the kind of formative assessment management techniques in TVET institutions in Western Kenya and determine their influence on trainee academic performance.

### Objective of the Study

The specific objective of the study was to determine the influence of formative assessment management techniques on trainee academic performance in national examinations in TVET institutions in Western Kenya.

**Figure 1: Conceptual Framework**

#### Independent Variable



#### Dependent Variable

##### Performance in KNEC

1. Exam Scores
2. Skills Assessment

#### Intervening Variable

- 4.0 Government Policies
- 5.0 Examination Policies

**Source:** Researcher, 2024.

### LITERATURE REVIEW

TVET plays a pivotal role in preparing individuals for the workforce, and the effectiveness of TVET programs is significantly influenced by the qualities of TVET trainers. The impact of these qualities on trainee performance varies across developed, developing, and third-world countries due to diverse educational systems, economic conditions, and social contexts (Burden-Leahy, 2021). Accordingly, trainers in developed countries possess advanced technical knowledge and skills relevant to the current industry standards (*ibid*). This ensures that trainees receive up-to-date and industry-aligned training.

Formative assessment management, including coursework and projects, is recognized as an

### Research Hypothesis

This study was guided by the following research hypotheses;  $H_{01}$ : *There is no significant statistical association between formative assessment management techniques mechanisms and trainee academic performance in examinations in TVET institutions in Western Kenya.*

### Conceptual Framework

By integrating this conceptual framework, the study provides a comprehensive view of the variables depicting how the independent variable interacts with the intervening variables and influences the dependent variable. Though the intervening variables may have an external influence on the dependent variable, their effect was not analyzed in this study due to resource limitations.

essential component of the learning process, providing valuable feedback to students and instructors. Research has shown that effective formative assessment management practices can enhance student learning outcomes, engagement, and motivation (Burden-Leahy, 2021). Therefore, earlier studies have emphasized the importance of practical and project-based assessments in preparing students for the workforce. However, there exists a research gap in the literature regarding the specific impact of the submission of formative assessment management coursework and project marks on academic performance in TVET institutions in Eastern Africa, including Kenya (Olabiya, 2021).

Existing research tends to focus more on summative assessments or general aspects of formative



assessment management rather than the influence of the submission process and its associated marks on student achievement in TVET settings. The current study aimed to address this gap by investigating how the submission of formative assessment management coursework and project marks influences trainee academic performance in TVET institutions in Kenya, with a specific focus on western Kenya. By examining the relationship between the timely submission of coursework, the quality of project work, and academic performance, this study seeks to provide insights into the unique dynamics of formative assessment management in the context of technical and vocational education. Additionally, the study explored how instructors' feedback on submitted coursework and projects impacts student learning and achievement.

Furthermore, the literature review shows a lack of empirical studies specifically examining the influence of formative assessment management submission on academic performance in TVET institutions within the Eastern African context (Sancar, & Deryakulu, 2021). Additionally, there is limited research addressing the perspectives of both instructors and students regarding the submission process and its impact on learning outcomes. Moreover, the existing literature may not adequately capture the unique challenges and opportunities associated with formative assessment management in the TVET context, particularly in Western Kenya. This study aimed to fill these gaps by providing empirical evidence and insights that are relevant to the specific educational landscape of TVET institutions in Western Kenya.

While there is limited specific literature on the influence of the submission of formative assessment management coursework and project marks on trainee academic performance in TVET institutions in Kenya, studies provide insights into formative assessment management and academic performance in educational settings. For example, a study by Olabiyi (2021) examined the impact of formative assessment management on academic achievement in Kenyan secondary schools. The findings highlighted the positive influence of timely submission of coursework and project marks on student learning outcomes, emphasizing the

importance of formative assessment management practices in enhancing academic performance.

In a similar vein, a study conducted by Caena *et al.*, (2021) explored the role of formative assessment management in improving trainee achievement in TVET education in Kenya. The study demonstrated that effective submission of practical assessment marks, including regular feedback and assessment of coursework, significantly contributed to improved academic performance among TVET trainees. These findings underscore the relevance of the submission of formative assessment management practical marks in the Kenyan educational context and provide valuable insights into its impact on student learning outcomes.

Furthermore, a study by Njenga (2022) investigated the influence of project-based assessments on academic performance in technical and vocational training institutions in Kenya. While not specifically focused on the submission of coursework and project marks, the study shed light on the importance of practical assessments in enhancing student learning and skill acquisition in TVET settings. The findings emphasized the positive correlation between project-based assessments and academic performance, highlighting the significance of practical evaluation methods in the TVET context.

Despite the valuable insights provided by these studies, there remained a research gap in the specific literature focusing on the influence of the submission of formative assessment management coursework and project marks on academic performance in TVET institutions in Western Kenya. The current study seeks to address this gap by providing empirical evidence and insights that are relevant to the specific educational landscape of TVET institutions in Kenya. By examining the relationship between the submission of formative assessment management coursework, project marks, and academic performance, the study aimed to contribute to the existing body of knowledge and provide practical implications for enhancing formative assessment management practices in the Kenyan TVET context.

## RESEARCH METHODOLOGY

### Research Design

This study employed a mixed-method research design, to effectively analyze educational settings within social contexts (Casteel, & Bridier, 2021). It made it possible to collect relevant data from a larger respondent pool (Lohr, 2021) and allowed natural observation of phenomena without manipulation. The study was conducted in public TVET institutions in Western Kenya counties namely, Bungoma, Busia, Kakamega and Vihiga. According to the 2019 census report these counties have a combined approximate population of 6.346 million. The people of this region place high value on education, including TVET education in which they have heavily invested.

### Target Population

In this study, the target population was 406 comprising 29 principals, deputy principals, registrars, examination officers, and 290 heads of academic departments from all the TVET institutions in the Western Kenya region (Kenya Association of Technical Training Institutions, 2024).

### Sampling Size and Sampling Techniques

Stratified sampling was used to ensure representativeness across National Polytechnics and Technical and Vocational Colleges (TVCs), resulting in a sample size of 200, with 21 from National Polytechnics and 179 from TVCs. There were 3 National Polytechnics and 26 TVCs thus the proportion of National Polytechnics to TVCS was 3:26; thus, the Proportion of National Polytechnics =  $3 / 29 \approx 0.103$ ; Proportion of TVCs =  $26 / 29 \approx 0.897$ . According to Casteel, & Bridier (2021), the ideal sample size for the study (n) is 200. Therefore, the sample size for National Polytechnics =  $0.103 * 200 \approx 20.6$  (Round up to 21) while the sample size for TVETs =  $0.897 * 200 \approx 179.4$  (Round down to 179). Purposive sampling was used to select the Principals, Deputy Principals in charge of academics (DPAC), registrars and examination officers while

simple random sampling was used to identify the heads of academic departments (HODS- Academic).

### Data Collection and Analysis Methods

Data collection involved the use of questionnaires and interview schedules. Validity was assessed through content, face, and construct measures, while reliability was determined using Cronbach's alpha which achieved a coefficient of 0.886. A pilot study refined the instruments and addressed potential issues. The analysis of data was conducted using descriptive statistics to obtain frequencies, percentages, standard deviations, and means. Before this analysis, the collected data were coded systematically to ensure accuracy and consistency. Each response was assigned a numerical code that facilitated the organization and interpretation of the data. The results were then presented using a graph and frequency table. Additionally, regression analysis was utilized to determine the relationship between the independent and dependent variables under study.

## PRESENTATION AND DISCUSSION OF STUDY FINDINGS

This study sought to determine the influence of formative assessment management techniques on trainee academic performance in the Western Kenya region. The results were analyzed by way of descriptive and inferential statistics and presented in tables.

### Descriptive Statistics Results

These statistics offer insights into the central tendency, variability and distribution of responses from 160 participants who included Deputy Principals in charge of academics, Registrars, Examination Officers and Heads of Academic Departments on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Their responses are triangulated with qualitative data obtained from 12 principals. The variables assessed include clear guidelines, utilization of formative assessment methods, access to resources and support, tasks, adequate training, emphasis on the importance of formative assessments, positive impact and the findings are presented in Table 1.

Table 1: Descriptive Statistics

Descriptive Analysis of Variable Indicators					
	N	Minimum	Maximum	Mean	Std. Deviation
Clear guidelines	160	1	5	3.26	1.353
Utilize various methods	160	1	5	3.23	1.342
Trainees have access to resources	160	1	5	3.21	1.394
Tasks reflect vocational scenarios	160	1	5	3.29	1.363
Adequate training	160	1	5	3.28	1.355
Emphasize formative assessment	160	1	5	3.23	1.379
Positively impact trainee performance	160	1	5	3.23	1.437
Valid N (listwise)	160				

Source: Field Data 2024

The findings from the study indicate a moderate agreement among trainees regarding the clarity of guidelines for formative assessments, with a mean score of 3.26 and a standard deviation of 1.353, suggesting variability in responses. This highlights the need for standardized guidelines in TVET institutions to enhance clarity. The mean score of 3.23 regarding the utilization of diverse formative assessment methods indicates some inconsistency in trainers' perceptions, suggesting the integration of varied techniques could improve engagement. Access to resources received a mean of 3.21, reflecting significant variability in trainees' experiences, emphasizing the necessity for equal resource availability. The relevance of assessments to real-world scenarios scored a mean of 3.29, indicating a need for closer alignment with industry practices. Training support for instructors received a mean of 3.28, suggesting variability in perceived training quality, necessitating continuous professional development. Overall, the study found that formative assessment management techniques positively impact academic performance, with a

mean score of 3.23. Principals emphasized the importance of clear guidelines, diverse methods, adequate resources, and practical task alignment in enhancing trainee outcomes. This was evidenced by the qualitative data obtained from the majority of principals indicating that;

*“Formative assessment management techniques significantly influence trainee academic performance in TVET institutions in Western Kenya. Clear guidelines, diverse instructional methods, adequate resources, and practical task alignment are essential components that contribute to enhancing trainee academic outcomes”.*

Improving these areas can foster a more effective learning environment in Western Kenya's TVET institutions.

Normality Tests Formative Assessment Management Techniques and Trainees Academic Performance.

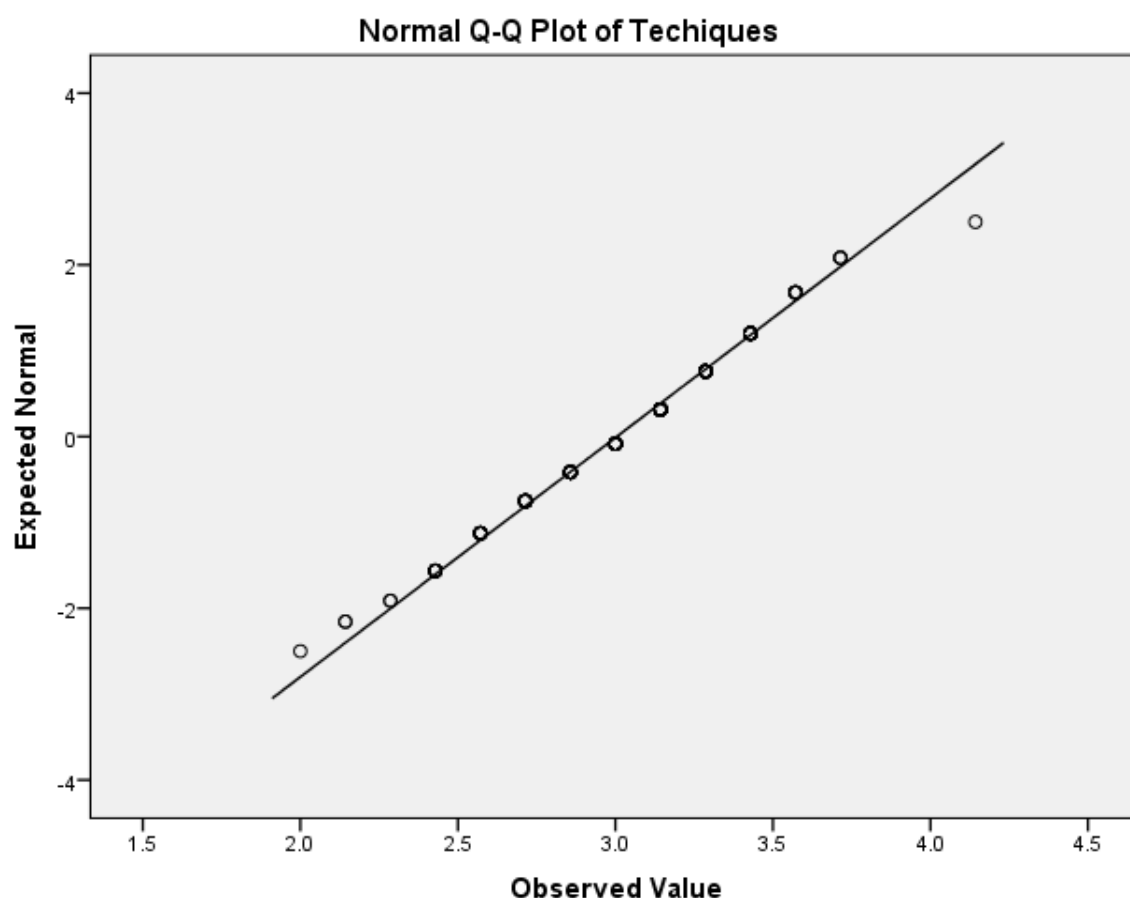
**Figure 2: Normal Q-Q Plot of Formative Assessment Techniques**

Figure 1 presents the Normal Q-Q Plot of formative assessment techniques, comparing observed values to expected values under normal distribution. Most data points closely align with the diagonal line, indicating that the distribution of the "Formative Assessment Techniques" variable approximates normality. Although there are slight deviations at both ends of the plot, these are not significant enough to impact the overall distribution. This visual inspection supports the assumption of normality, which is crucial for the validity of parametric statistical tests that require normally distributed data. Consequently, the "Formative Assessment Techniques" data can be reliably used in further parametric analyses. The normality of this variable suggests that subsequent analyses will yield accurate insights into how various formative assessment management techniques affect trainee academic performance in TVET institutions.

### Regression Analysis Findings

The regression analysis highlights a strong and statistically significant relationship between formative assessment management techniques and trainee academic performance in TVET institutions in Western Kenya. The model summary indicates a multiple correlation coefficient ( $R$ ) of 0.995, suggesting a very strong positive correlation, with 99% of the variance in academic performance explained by these techniques ( $R^2 = 0.990$ ). The standard error of the estimate (0.02479) reflects high predictive accuracy.

ANOVA results affirm the model's significance with an F-value of 14914.327 ( $p < 0.001$ ), indicating that formative assessment techniques significantly predict academic performance. The coefficients table reveals that for each unit increase in formative assessment techniques, trainee performance increases by 0.972 units, with a nearly perfect correlation ( $\text{Beta} = 0.995$ ). The 95% confidence



interval for this coefficient (0.956 to 0.988) indicates precise estimation.

These findings suggest that effective management of formative assessments such as regular feedback and adaptive teaching can enhance academic performance. Educational stakeholders should prioritize integrating these techniques into curricula and provide professional development for instructors. Overall, the study rejects the null hypothesis, supporting the conclusion that formative assessment techniques are crucial for improving educational outcomes in TVET institutions. Future research could further investigate specific techniques and their effectiveness across diverse contexts.

The study reveals a significant positive correlation between formative assessment techniques and trainee academic performance in TVET institutions in Kenya. Effective practices like regular feedback and adaptive teaching can substantially enhance learning outcomes, as supported by Black & Wiliam (2018), who noted an average improvement of 0.7 standard deviations in student performance. The findings advocate for the integration of formative assessments into curricula and emphasize the need for professional development for instructors to improve teaching methods. Formative assessments bridge teaching and learning, enabling students to self-regulate and improve academic outcomes. The results align with Carless (2020), who found that formative feedback significantly boosts final grades. The study also underscores the importance of continuous professional development and the role of technology in enhancing student engagement and performance.

## CONCLUSION

The research highlights that effective assessment management techniques within TVET institutions significantly influence academic performance. The findings indicate that 99% of the variance in trainee performance can be attributed to management practices that include clear guidelines, diverse assessment methods, and adequate administrative support. These practices create a supportive learning environment that encourages trainee engagement and motivation. By prioritizing sound management techniques, institutions can enhance the overall

educational experience, ensuring that trainees feel supported and equipped to succeed.

## Recommendations

Based on the findings, several recommendations can be made to enhance the effectiveness of formative assessment practices in TVET institutions:

- Institutions should establish structured feedback systems that emphasize clarity and timeliness. This actionable feedback will help trainees identify areas for improvement, directly impacting their performance in exams.
- Continuous professional development programs for educators are essential. Training should focus on effective formative assessment strategies, ensuring that educators can implement these techniques to enhance trainee outcomes.
- TVET institutions should adopt a variety of formative assessment methods, such as practical assessments and peer evaluations. This diversity caters to different learning styles and promotes a comprehensive understanding of vocational skills, positively affecting academic performance.
- Institutions should implement regular monitoring and evaluation processes. This will allow for continual assessment of the effectiveness of formative assessment strategies, enabling timely adjustments to enhance their impact on academic performance in national examinations.

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## Conflict of Interest

The author(s) declares no conflict of interest

## Statement of Informed Consent

Informed consent was obtained from all individual respondents who participated in this study.

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