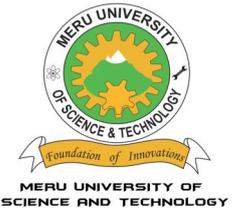




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The perception of the teacher trainees on the implementation of e-assessment in the selected teacher training colleges in Kenya

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ABSTRACT

KEYWORDS

Assessment
E-assessment
ICT,
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Perception

The Kenya National Examinations Council (KNEC) is currently implementing the integration of technology in conducting assessments to replace the traditional mode of paper and pen. The purpose of this study is to examine the perception of the teacher trainees towards the implementation of e-assessment in the upgrade course of the Diploma in Primary Teacher Education (UDPTE). The study adopted a descriptive research design and was carried out in two (2) public teacher training colleges with a target population of two hundred and forty (240) teacher trainees for the UDPTE programme. All the trainees in the sampled colleges were purposively selected to participate in the study since all of them had participated in the formative e-assessment. An online Teacher Trainees Questionnaire (TTQ) was used to collect information relating to trainees' perception of e-assessment.

The reliability coefficient alpha (α) of TTQ was found to be 0.78 from the pilot study making the instrument valid for data collection. The data collected was analyzed using both descriptive and inferential statistics by the use of SPSS software version 26.0. The study findings established that a significant number of teacher trainees were upgrading in Option B as compared to Option A learning areas. The teacher trainees believed that the best way to finance the Upgrade of Diploma in Primary Teacher Education program (UDPTE) in Kenya was by using bursaries or scholarships and not loans. A significant number of teacher trainees support the adoption of e-assessment but they are of the view that the colleges were not yet prepared due to lack of necessary technological infrastructure. It was further noted that the teacher trainees need more training on basic computer skills in order to improve their typing skills for responses to enhance the complete submission of assessments on the portal in their respective learning areas. The Ministry of Education needs to equip the teacher training colleges with the necessary technological infrastructure and continuously retool tutors on how to integrate technology tools in the assessment procedures.

Introduction

The implementation of e-assessment across various examination bodies is gaining momentum in the world to inculcate 21st-century skills among

learners. Winkley (2010) defines assessment as the process of gathering information on what students know or have mastered based on their educational experience. The assessments are carried out inform of formative or summative assess-

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ments. Formative assessments are quizzes, tests, games, project presentations, and group activities that evaluate how much learners have acquired specific skills. Formative assessments are more flexible and help to keep students engaged in the content of learning. It is through formative assessment that the teacher can be able to measure to what extent the students understood the concept being taught. Formative assessments give the teacher personalized instructional reports to meet the learners' individual needs. Summative assessment occurs after completion of the learning process to determine how much they have mastered the content. Summative assessments are in the form of tests, final examinations, reports, presentations, and projects. The concept of E-assessment includes the use of multiple-choice, online, or electronic submission, computerized adaptive testing such as Frankfort Adaptive concentration test, and computerized classification testing as discussed by Lafuente et al., (2014). Therefore, it is important to note that both formative and summative assessments are important for the teacher or the trainer to inform the process of learning. The majority of the tutors and lecturers use the traditional method of paper and pen for formative and summative assessment in their respective colleges but with the implementation of the Competency Based Curriculum, there is a need for a paradigm shift from the paper and pen assessment to e-assessment. The need to use e-assessment is gaining momentum in teacher training colleges through the implementation by the Kenya National Examinations Council (2018). Therefore, the teachers who have gone back to colleges for the upgrade programs in line with the requirements of the Competency Based Curriculum and Teachers Service Commission (TSC) have started using e-assessment.

The Kenya National Examination Council (KNEC) has been integrating the use of Information Communication Technology (ICT) in the process of administration of national examinations and assessments through online registration and administration of School Based Assessments

(SBAs). The use of ICT in the administration of assessments is to inculcate 21st century skills among the learners and potential teacher trainees. The first e-assessment was administered to the upgrade in Diploma in Early Childhood Teacher Education (UDECTE) trainees between 14th and 18th November 2022. Therefore, it is important to note that KNEC (2018) is working towards implementing e-assessment administration in all teacher education programs in line with its strategic plan for 2021-2026 and the implementation of a Competency Based Curriculum (CBC) by the Ministry of Education. The Kenya Institute of Curriculum Development (KICD) has developed a road map to design the training of teachers on a competency-based curriculum that includes a Diploma in pre-primary teacher education, a Diploma in Teacher Education, a Diploma in technical teacher education, a Diploma in special needs teacher education and bachelor's degree in teacher education that is a global practice and demands of the society.

Research Problem

Assessment is an integral component of an educational process such that it promotes learning and evaluates the learning outcomes. Therefore, it is important to ensure that the assessment procedures are aligned with the curriculum needs through formative and summative procedures. The use of technology in assessment is very critical in enhancing 21st century skills among learners or teacher trainees. The introduction of a Competency Based Curriculum in Kenya was to deliver learning and evaluate the strengths and weaknesses of learners through the production of holistic individuals with competencies, values, knowledge, and skills necessary to survive in a competitive world. E-assessment is a component of e-learning, and more studies have been carried out on e-Learning as opposed to e-assessment. Educational researchers have investigated more on the perceptions of teachers, tutors, and students on e-learning, but there is relatively little study about the perceptions of students toward e

-assessment. The purpose of this study is to investigate the perception of the teacher trainees on e-assessment in the teacher training colleges in Kenya.

Research Objectives

- i) To establish the perception of teacher trainees on the financing of teacher education programs in teacher training colleges in Kenya
- ii) To examine the feelings of the Teacher Trainees on the implementation of E-assessment in the selected Teacher Training Colleges in Kenya

Literature Review

Introduction

The study investigates the perception of the teacher trainees about the implementation of E-assessments in selected teacher training colleges in Kenya. Assessment plays a very critical role in evaluating the competencies and skills acquired by teacher trainees in their professional development. The quality of education in any country is shaped by the type of assessment used to determine the effectiveness of the training process and whether the learning outcomes have been achieved. In this regard, with the change of the curriculum from the 8-4-4 system to a 2-6-3-3-3 Competency Based Curriculum that focuses on the accomplishment of learner's competences, teacher educators need to re-think how the quality of assessments should be implemented. According to Maruti (2010), the change in curriculum in developed countries results in different modes of learning such as Computer Based Training (CBT), Web Based Training (WBT), Synchronous and Asynchronous learning, and Distance Education (DE). Assessing the learning outcomes is the main concern of educational stakeholders such as the college tutors and the Kenya National Examinations Council (KNEC). The mandate of the Council is to assess and certify qualified candidates of basic and tertiary education systems through effective assessment procedures. The holistic evaluation of the new competency system

of training in the teacher training colleges depends entirely on the assessment procedures used by the Kenya National Examinations Council to determine the learning outcomes. The Council has introduced e-assessment procedures in the administration of all teacher education assessments to align them with the new dynamics of competency-based curriculum as well as competency based assessments. Competency based assessment is a framework developed by the Council to systematically gather learners' knowledge, skills, and attitudes to enhance the acquisition of competencies.

Theoretical Adoption of E-assessment

This study is anchored on Rogers' theory (2003) of the diffusion of innovations model for transformational change. The Rogers theory was based on 5000 numerous and rigorous evidence based studies that explained 47% to 87% of the variance in the rate of adoption of innovations. The theory highlighted five attributes that are very critical for any organization that is willing to adopt e-assessment in evaluating learning outcomes. The attributes are; relative advantage, compatibility, trialability, observability, and complexity. Relative advantage is the degree to which an innovation is viewed as better than the idea it supersedes. The greater the perceived advantage the faster the rate of adoption and that is why the adoption of e-assessment by KNEC is very critical to the teachers, tutors, and the student's fraternity. The study by McCann (2009) on the "Factors affecting the adoption of an e-assessment system, Assessment & Evaluation in Higher Education" affirmed that it is very important to understand the perception of the stakeholders towards e-assessment in order to speed up the rate of adoption by the Council. If the stakeholders have a negative perception of the adoption of e-assessment, then it will be difficult for the Council to successfully migrate from paper and pen assessment to e-assessment. Compatibility is the degree to which an innovation is viewed as difficult to understand and use. Therefore adoption

increases as complexity decreases. According to Gibbs (2006), the E-assessment innovation should be seen as consistent with the existing values, past experiences, and needs of potential adopters for easy adoption by the Council. Trialability is the degree to which an innovation can be experimented with on a limited basis. An innovation that can be tried creates less uncertainty for the potential adopter and so speeds up the adoption rate. Observability is the degree to which the results of innovation can be seen by potential adopters. Adoption increases if adopters can see the results of the innovation. If the stakeholders of education can easily see the results of e-assessment, then it will be very easy for the Council to adopt e-assessment.

The Formats of Assessments

Assessment is a critical component of measuring learning outcomes. It provides for progress in the learning process, identifies the learner's strengths and weaknesses, and checks the learning outcomes. The Ministry of Education policy on the assessment of learners stipulates two forms of assessment: formative and summative assessments across all levels of learning and training (Republic of Kenya, 2011). According to Klint (2020), the common types of assessments include Diagnostic assessment, formative assessment, and summative assessment. Diagnostic assessment is a form of pre-assessment or a pre-test where teachers can evaluate students' strengths, weaknesses, knowledge, and skills before their instruction. It is used to gauge where students currently stand, their intellectuality, emotionally and ideologically. The assessments are typically low-stakes and usually don't count for grades. They consist of sets of written questions (multiple choice or short answer) that assess a learner's current knowledge base or current views on a topic/issue to be studied in the course. Formative assessment is used to monitor student learning to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning. Formative assess-

ment takes place during the learning process. The types of formative assessment include assessment for learning and assessment as learning. Assessment for learning involves the teacher or the tutor gathering assessment information to better understand where the students are in the teaching and learning process to make informed decisions for improving the learning process. Boubekeur (2021) emphasized that assessment for learning is explicitly embedded in the learning or training instruction and it should not be used for evaluation or grading purposes. Assessment as learning is a learner centered approach where the learner gathers information about their learning through self or peer assessment to improve the learning progress. Stachiowak (2013) explained that the learners compare their learning with pre-defined criteria to better understand areas of weakness or strength. Summative assessment is used to evaluate student learning at the end of an instructional unit by comparing it against some standard or benchmark. In Kenya, the teacher trainees sit for a summative assessment to measure the degree of achievement of the training objectives to qualify for the teaching profession. Summative assessments are often high stakes, which means that they have a high point value associated with them. They measure the degree to which a learner has demonstrated mastery of content for grading or reporting. The study of Dermo (2009) on "*e-Assessment and the Student Learning Experience: A Survey of Student Perceptions of e-Assessment*" noted that it is important for teachers to ensure that all assessments are authentic since the learners are exposed to authentic tasks or projects in the competency based curriculum. Authentic assessment ensures that students are tasked to perform real world tasks that demonstrate meaningful application of knowledge and skills. Authentic assessment must have a task for which the students are performing and a rubric for scoring. Authentic assessments are more valid than conventional tests because learning outcomes require high-order thinking skills. Authentic assessments are majorly used in e-assessment

because they can evaluate what the students have learned and apply them beyond the classroom.

Introduction of E-assessment in Teacher Education

The Kenya National Examinations Council (KNEC) has implemented the use of technology in the management and administration of teacher education assessments in colleges across Kenya. The main objective of the Council is to roll out E-assessment in the administration and management of other School and post-school examinations. The study by Whitelock (2006) shows that different examination bodies are offering their examinations online. For instance, the British Council offers online examinations that include IETS for English language tests, IGCSE, and School exams for Cambridge examinations to over 2 million people across the world. Local examination bodies like Kenya Accountants and Secretaries National Examination Board (KASNEB) have started offering some of its papers online. The majority of international and local universities are offering online examinations to their potential candidates. The University of Dundee is one of the online leading universities in the United Kingdom offering online assessments to over 18,000 candidates (Alexander, 2001). The training of teacher trainees plays a critical role in the effective implementation of the competency based curriculum in Kenya and therefore the teachers must be equipped with the necessary skills of teaching the learners at the primary level. The acquisition of digital skills among learners is one of the compulsory competencies of the 21st Century that learners exiting the education system at any level must have to meet the demands of the labour market. According to Otunga and Nyandusi (2009), the development of a new curriculum by the Kenya Institute of Curriculum Development (KICD) for the teacher training colleges requires the use of technology in training the teacher trainees and therefore KNEC has to use technology in assessment to ensure that the teacher trainees are competent.

E-assessment is an assessment created, writ-

ten, delivered, and marked with technology on an online platform. The marking of the student's scripts is done using a computer and therefore it is called e-marking. The tutors need to be retooled so that they can use computers to score and award the student's accurately in the assessment that requires a functional computer or tablet with access to stable internet connectivity. The introduction of the Competency Based Curriculum (CBC) by the government of Kenya in 2017 has resulted in a significant shift in the method of assessment and therefore the teacher trainees must be equipped with digital skills relevant to the teaching profession. Maruti (2010) emphasized that the teacher training institutions are in turn under pressure to adequately train and prepare teachers to handle the learners enrolling in the CBC. The Millennium learners have access to technological devices like computers, Smart TVs, Mobile phones, and digital cameras that are used in capturing information and therefore the teachers need to harness this technology to improve quality education. Therefore, e-assessment is synonymous with electronic assessment, digital assessment, online assessment, and computer based assessment that involves the use of technology to administer assessments as compared to paper and pen assessments. The E-assessments should include traditional tests like multiple choice questions (MCQs), Essay questions, authentic assessments, and project based assessments that are administered online (Appiah & Van Tonder, 2018). The involvement of the college tutors and teacher trainees is very important to understand the operation and use of technology in the process of administration and management of assessments. E-assessment enhances immediate feedback to the students since the assessments can be scored in real-time by the tutors and the various digital tools incorporated in the online platform can be used to motivate the students towards learning. The purpose of e-assessment is to use technology to assess the performance and measure the students learning. The implementation of E-assessment by the Kenya National Examinations

Council was to overcome the inadequacies of the traditional mode of assessment that involved the use of pen and paper. The advancement of technology has resulted in e-learning hence there is a need for e-assessment (Brink and Lautenbach, 2011). E-assessment reduces issues of high stake examinations, increased malpractices, and cases of corruption and bribery to access examination related materials. The advantage of e-assessment is reduced workload among the tutors, immediate feedback, electronic capture of candidates' answer scripts, reduced cost of examination management, and enhanced security in the administration of examinations.

E-assessment Tools and Design

The structure and design of the online assessment platform are very important to the candidates and the tutors for them to easily adopt the e-assessment. The majority of the tutors and students who have difficulty using technology find it very hard to access the E-assessment platform. The study of Hichour (2022) on "*Teachers' Experience in E-assessment: Case Study of EFL Teachers in Algerian Universities*" stressed that there is a need to ensure that the portal is user-friendly and the students can find easy to navigate from one question to the next question. The key components of the e-assessment portal include the Authoring system, Registration system, Assessment Engine, and security system. The authoring system is used by the course administrator to create and edit assessments for the sole purpose of administration. The financing of teacher education programs as well as e-assessment is very critical to the teacher trainees. The majority of the teacher trainees use loans and financial support from family members to register for assessments and complete their tuition fees in their respective colleges. The teacher trainees must pay assessment fees in order for them to be allowed by KNEC to register for any formative or summative assessments.

The registration system contains the database of all the users that include the tutors, administrators, assessors, and students with confidential

personal information for easy access to the system. The assessment engine is a database of items or questions per learning area. It also contains responses given by the students. It stores scores awarded to students by the examiners and evaluates and gives feedback to the candidates in form of reports. Ikileng (2015) emphasized that the security system is a very important platform for screening the users who are accessing the system. The security platform provides confidentiality to the information stored in the system and prevents external and internal attacks or threats for malicious purposes. The users are provided with confidential user names and passwords with one-time passwords to enable them to log into the system and the candidates have restricted access time with more inferential integrity to secure the assessments. The online assessment tools include Learning Management Systems (LMS), Toolbook, Assessment Generators, Classmakers, Flubaroo, and Moodle (Dhar & Yammiyavar, 2012). The majority of examination bodies develop their system for the administration of assessments or some customized to meet the demands of their organization. The online assessment tool should have elements like alignment, rigour, precision, bias, and scoring that are critical to enhancing the validity and reliability of scores awarded to potential candidates.

Research Methodology

The study adopted a descriptive research design. According to Creswell, (2013), descriptive research design is a quantitative method used to describe and analyze variables in a study. The target population was an estimated 12,000 teacher trainees based on the Upgrade Diploma in Primary Teacher Education (UDPTE) across the teacher training colleges. Two (2) teachers training colleges with a sample of 240 candidates were randomly selected to be involved in the study. All the UDPTE candidates from the 2 colleges were purposively selected to participate in the study. A structured questionnaire with a reliability coefficient alpha α of 0.82 was sent online to the selected

sample size after piloting. The questionnaire contained two sections A and B. Section A captured information about the biodata of participants and section B captured information relating to the perception of the teacher trainees on the online assessment platform. The data collected was cleaned and exported from Google Drive to SPSS version 26.0 for analysis. The data were analyzed using descriptive statistics and was displayed in form of frequency tables, graphs, and charts.

Findings and Discussion

Introduction

The main purpose of the study was to investigate the perception of the Teacher trainees on the implementation of E-assessment in the selected Teacher Training Colleges in Kenya. The chapter critically analyses and presents data in the form of frequency tables, charts, and graphs.

Background Information of Participants

A sample of two hundred and forty (240) teacher trainees of the Upgrade in Diploma Primary Teacher Education (UDPTE) representing 63.3% female, 29.2% male, and 7.5% preferred not to mention their gender participated in the study. Table 1 shows the background information relating to the teacher trainees in the selected Teacher Training Colleges in Kenya. It was observed that the majority of the

Variables	Biodata of Participants	Frequency (N)	Percentage (%)
Gender	Prefer not to say	18	7.5
	Male	70	29.2
	Female	152	63.3
Total		240	100
Age	Less than 24 years	18	7.5
	24 - 29 years	117	48.8
	30 - 34 years	78	32.5
	35 - 44 years	27	11.3
	Above 45 years	0	0
Total		240	100
UDPTE Program	Option A	115	47.9
	Option B	125	52.1
Total		240	100
Duration for UDPTE Program	Not willing to mention	9	3.8
	4 - 6 months	61	25.4
	7-11 months	161	67.1
	1 year	9	3.8
	More than 1 year	0	0
Total		240	100
Duration Adequacy of UDPTE Program	No	169	70.4
	Yes	53	22.1
	Not sure	18	7.5
Total		240	100

Table 1: Background Information of Participants

teacher trainees were female as compared to their male counterparts.

A significant number of teacher trainees who were upgrading to Diploma in Primary Teacher Education were of age bracket between 24 - 29 years and there were no participants of the age bracket above 45 years. This may be due to the employment restrictions set by the Teachers Service Commission (TSC) such that those prospective teachers seeking first-time employment by the Commission must be below the age of 45 years and therefore there is no need for teachers above the age of 45 years to go for the upgrade program and yet they will not be employed. A proportional number of trainees were upgrading to Option B learning areas as compared to Option A learning areas. Option A trainees specialize in mathematics and science-oriented subjects while Option B specializes in learning areas of humanities (KNEC, 2018). The majority of the teacher trainees had been in college for the up-

grade program for the duration between 7 to 11 months and 3.8% of the teacher trainees had stayed in the college for 1 year and the same number did not wish to mention their duration in the College for the upgrade program. It is important to note that the majority of the teacher trainees were of the view that the duration of the UDPTE program was not adequate for them to be equipped with the requisite skills to handle the Competency Based Curriculum (CBC).

Availability of ICT Resources in Colleges for E-assessment

The study by Chumba (2016) on “Assessment of the Effect of E-learning on Students’ Learning Process in University of Nairobi” established that the availability of Information Communication Technology (ICT) resources in colleges is very crucial for the effective implementation of e-assessment. The study sought to find out the perception of teacher trainees on the availability and use of technology resources in teacher training colleges. Figure 1 shows that the majority of the teacher training colleges had borrowed tablets from the nearby public primary schools for use during the e-assessment period through the Sub-County director of education within their respective regions.

It was established that the majority of teacher training colleges (59.17%) had borrowed tablets for the formative e-assessment and the college had internet connectivity but the network was not stable for all the trainees to log in to the KNEC portal at once to access the assessment. Other ICT resources like desktops, laptops, and an equipped computer room were not available for the teacher trainees but the tutors could use the few laptops that were available in the colleges. The teacher trainees were provided with tablets and were enabled by the college principal to log into the portal to access the assessment. The study sought to find out the percentage of trainees who could successfully submit their respective learning areas in the formative e-assessment of School Based Assessment (SBA) for 2023. Figure 3 shows that the majority of teacher trainees were able to successfully submit their assessment work in Inclusive Education (99.42%), Curriculum Studies (99.08%), and Indigenous Languages (97.50%) respectively. Of concern was the proportional number of trainees who submitted their assessment work in Mathematics at 73.33% and Sociological and Philosophical Foundations of Education at 82.92% as seen in Figure 3. The poor internet connectivity in the majority of teacher training colleges hindered a few candidates to

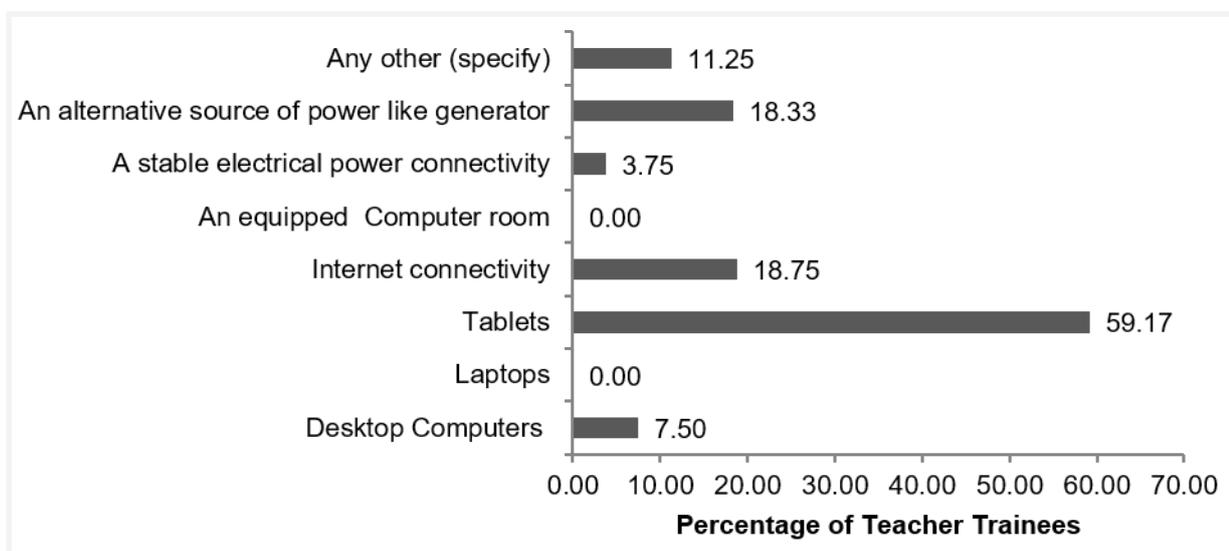
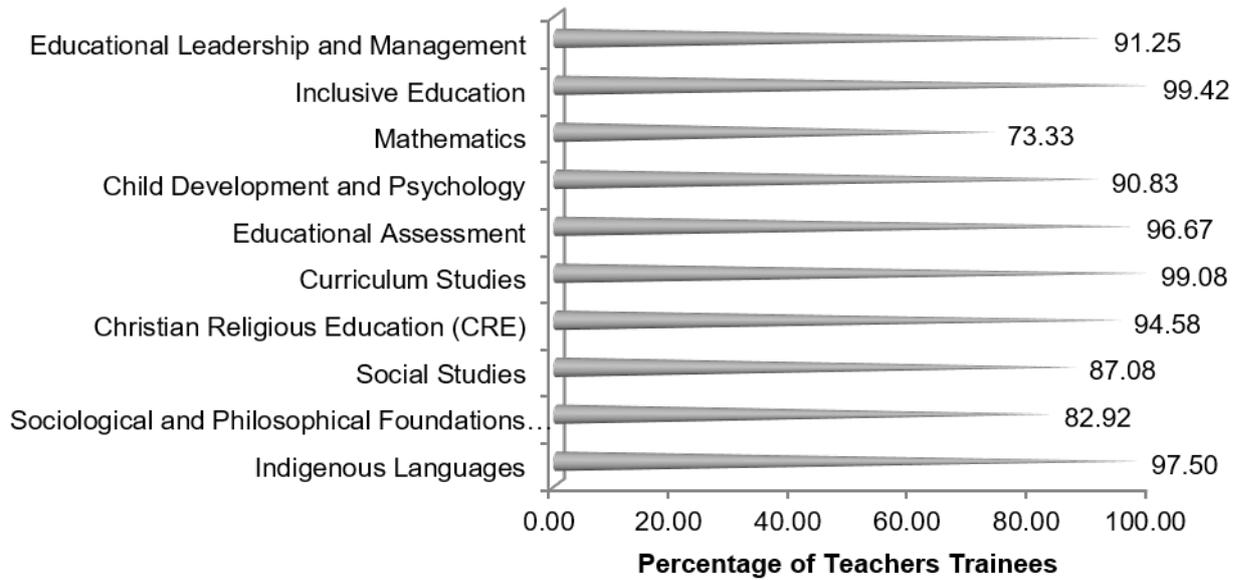


Figure 1: Functional ICT Resources available in TTCs



submit all items in their respective learning areas.

The teacher trainees perceived several factors that could have hindered them not to submit their assessment work successfully. Figure 4 shows that system failure of the e-assessment was the major cause for the majority of candidates not to submit their work at 88.75%, followed by poor internet connectivity at 66.25% and Non-functional tablets at 62.50% respectively.

Reasons for not submitting the Formative E-assessment for Teacher Education

The study established that *Lack of technological skills on how to submit the formative e-assessment work* at 3.33% was the least factor that hindered the candidates from successfully submitting their work, followed by candidates *not well prepared for e-assessment* at 3.75% and *lack of responses to questions for submission* at 3.75%. The majority of the teacher trainees were also of the view that the time allocated for each paper in the formative e-assessment was not adequate and this was asso-

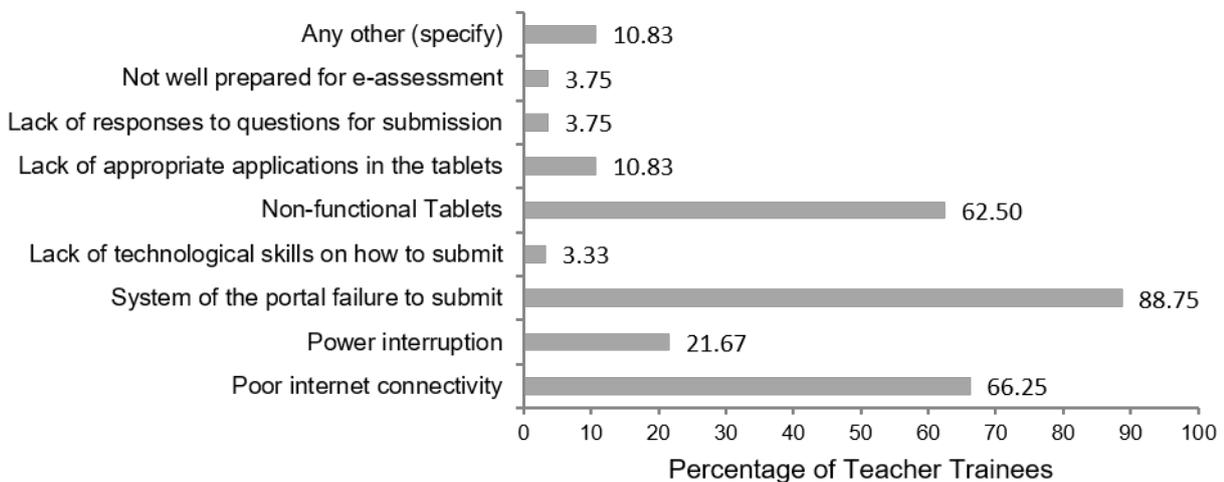


Figure 3: *Reasons for not submitting the Formative E-assessment for Teacher Education*

S/No	Statement	SA	A	N	D	SD	mean	s
1.	I enjoy the doing assessment using ICT resources like computers/laptops and Tablets	7.5	11.3	0	18.3	55.4	4.11	1.346
2.	I interacted with tablets before the e- formative assessment	3.8	15.0	7.1	25.8	40.8	3.92	1.238
3.	E-formative assessment improved my digital training skills	7.4	11.1	18.5	28.4	22.2	3.54	1.234
4.	I learned how to use tablets and solve emerging technological challenges during the e-assessment.	7.5	11.3	18.8	28.7	22.5	3.49	1.315
5.	I support the use of ICT tools in doing assessments	7.5	22.5	7.5	32.9	25.8	4.04	1.193
6.	I feel more relaxed and comfortable when doing e-assessments as compared to paper and pen examinations	3.8	11.3	7.5	25.0	45.0	4.25	1.018
7.	I was supported by my tutors and KNEC officials on the technological troubleshooting issues during the e-assessment	3.8	3.8	3.8	32.9	44.6	3.38	1.607

Table 2: Statements about the Perception of Teachers Trainees on E-assessment

Note: SA - Strongly Agree, D- Agree, N-Neutral, D- Disagree and SD - Strongly Disagree, and S- sample standard deviation

ciated with challenges of solving and troubleshooting technical issues relating to the tablets and the internet connectivity. A significant number (63.3%) of the teacher trainees were of the view that they will not support the use of technology in assessment since they lacked the requisite ICT resources for effective implementation of e-assessment in teacher education programs. For effective implementation of e-assessment, the Kenya National Examinations Council (KNEC) has continuously trained the stakeholders and improved the e-assessment portal to ensure that the candidates are comfortable during the summative e-assessment.

Perception of E-Assessment by the Teacher Trainees

The teacher trainees were provided with statements relating to their feelings about formative SBA 2023 e-assessments. The statements were rated on a five-point Likert scale starting from SA - Strongly Agree, A- Agree, N-Neutral, D- Disagree, and SD - Strongly Disagree. Table 2 shows the fre-

quency distribution in percentages of the teacher trainee's perceptions of various statements relating to e-assessment.

The teacher trainees from the sampled colleges agreed ($x = 3.38$ and $s = 1.607$) that they were not adequately supported by their tutors and KNEC Officers on the technological troubleshooting issues during the e-assessment period. This might be due to a lack of adequate KNEC officers in each college to provide troubleshooting services and a lack of ICT skills among the tutors to assist the teacher trainees. The lack of ICT tools in the majority of colleges makes the teachers and trainees not prefer to use ICT in conducting assessments as well as administering e-assessments since the majority of the colleges don't have a reliable internet supply. The download and upload speeds for the internet in the colleges sampled was below 10mbps which made it difficult for the candidates to respond to questions and submit via the KNEC portal. The colleges were encour-

S/No	Statement	SA	A	N	D	SD	Mean	s
1	The assessment portal was easy to access	3.8	6.7	22.5	18.8	44.6	3.97	1.153
2	The assessment portal was easy to use and navigate	3.8	14.2	15	15	44.6	3.89	1.272
3	The information displayed on the portal was useful for the conduct of the e-assessment	37.5	25.8	29.6	1.1	1.8	2.95	1.136
4	The portal is good but needs slight improvement to make it user friendly	30	37.1	10.8	10.8	3.8	2.15	1.122
5	It was easy to use portal applications to perform mathematical calculations	7.5	3.3	25.8	7.5	37.1	3.78	1.315
6	The navigation buttons like save, next, and submit need to be improved	63.3	11.3	3.8	0	14.2	1.82	1.442
7	The KNEC portal was frustrating when doing an e-assessment.	63.7	7.5	10.4	1.6	14.6	1.90	1.461
8	The questions were readable and the diagrams used in some questions were clear	22.5	26.3	21.7	11.3	10.8	2.59	1.297
9	The space provided for responses was adequate.	45	22.5	14.2	7.5	3.3	1.94	1.136
10	It was extremely slow to login into the KNEC assessment portal	59.6	7.5	10.8	3.8	10.8	1.91	1.406

Table 3: Statements about the Ease of Use of the KNEC E-assessment Portal

Note: SA - Strongly Agree, D- Agree, N-Neutral, D- Disagree and SD - Strongly Disagree, and S- sample standard deviation

aged by KNEC to increase their internet speed to at least 20Mbps to enable the candidates to access the online assessments with ease. There is a need for equipping the teacher training colleges with functional ICT devices like tablets, laptops, and stable internet and electrical energy supply for effective implementation of e-assessment as well as e-training in preparation for competency based curriculum. The study also sought to find out the perception of the teacher trainees on the functionality of the KNEC e-assessment portal. Table 3 shows statements that relate to the functionality of the e-assessment during the UDPTE 2023 formative e-assessments that were rated by teacher trainees from strongly agree to strongly disagree.

The teacher trainees believed that the questions in each of the learning areas were readable and legible while diagrams used in some items were clear in the formative e-assessment administered by KNEC during the SBA 2023 for the UDPTE program. The majority of the teacher trainees felt that the KNEC portal was frustrating when doing e-assessment and the navigation buttons on the e-assessment like save, next and submit need to be improved. The portal needs to be developed further to be user-friendly for the end users. The teacher trainees feel that the portal is good but needs slight improvement to make it user-friendly as seen in Table 3. A proportional

number of teacher trainees were of the view that the information displayed on the portal was useful for the conduct of e-assessment but a significant number of teacher trainees that were doing mathematics and were of the view that the portal lacks applications for performing mathematical calculations. The majority of the candidates felt that the space provided for responses for each item per learning area was adequate for writing a response to a particular response. Following recommendations from various stakeholders of education, the e-assessment portal has been improved in preparation for the summative e-assessment for teacher education in Kenya.

Conclusion

The main purpose of the study was to investigate the perception of the teacher trainees on the implementation of E-assessment in the selected Teacher Training Colleges (TTCs) in Kenya. The study findings show that a proportional number of teacher trainees were upgrading for Option B learning areas as compared to Option A learning areas. The teacher trainees believed that the best way to finance the Upgrade of Diploma in Primary Teacher Education program (UDPTE) in Kenya is by using bursaries or scholarships and not loans. A significant number of teacher trainees support the adoption of e-assessment but they are of the view that the colleges were not yet prepared due to

lack of necessary technological infrastructure. It was further noted that the teacher trainees need more training on basic computer skills in order to improve their typing skills for responses to enhance the complete submission of assessments on the portal in their respective learning areas.

Recommendation

The Ministry of Education needs to equip the teacher training colleges with the necessary technological infrastructure and continuously retool tutors on how to integrate technology into the assessment procedures.

The e-assessment portal needs to be improved by KNEC on the functionality aspects to make it user-friendly for the effective administration of teacher assessments in the Country.

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