PERSPECTIVES ON TUTORS' PREPAREDNESS AND ADOPTION OF ICT IN PUBLIC TEACHER TRAINING COLLEGES IN KENYA

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This study was concerned with perspectives on tutors' preparedness and adoption of ICTs in public teacher training colleges. The rationale was based on the view that properly designed, learning materials inspired by integration of ICT and delivered by technology add value to a teaching environment on which contact hours are limited. The curriculum needs academic standards and the development of digital age skill for the 21st century learners if vision 2030 and beyond education goals have to be realized. The study findings revealed that preparedness on integration of ICT was at an infant stage. Adoption on integration of ICT by tutors into their instructional process was not significantly related to their years of teaching experience, there was no significant relationship between the tutors' attitude towards integrating ICT and tutors faced several challenges in an attempt to integrate ICTs into the curriculum.

Keywords: Preparedness, Integration, Adoption, Information Communication Technologies

Background to the Study

The introduction of information communication technology into the curriculum mainstream has been widely expected to penetrate and transform teaching and learning. This paper examines perspectives on tutors' preparedness and adoption of ICT in public teacher training colleges in Kenya. The rationale was based on the view that properly designed, learning materials inspired by integration of ICT and delivered by technology add value to a teaching environment on which contact hours are limited. The term ICT encompasses the range of hardware (desktop and portable computers, projection technology, calculators, data-logging, and digital-recording equipment), software applications (generic software, multimedia resources), and information systems (Intranet, Internet) available in colleges. One potentially important contextual factor which shapes how technology is perceived and used by tutors is the 'community of practice' (Lave and Wenger 1991) associated with their subject. This is a social framework within which the planning, support, and evaluation of student learning takes place. Each subject area could be said to share a set of tools and resources; approaches to teaching and learning; curriculum practices; cultural values, expectations, and aims. Departments develop their own perspectives on objectives, both internal and external to the college, and they shape their actions accordingly (Firestone and Louis 1999). In England, recent educational reforms have led to departments playing a more active part in mediating between government policy and classroom practice through the development of departmental teaching policies and schemes of work that is detailed plans for delivering the new concept. The indirect effect of the reforms has, thereby, been to increase collegiality within subject departments (Cooper and McIntyre 1996, Donnelly 2000). Their sharing of practice and experience will encompass the introduction and integration of ICT into subject teaching (Williams et al. 2000, Rogers 2002).

However, subject specialization at either level is inevitably a focus to ongoing redefinition and adoption. They are responsive to conflict, challenges, and dilemmas. The subject practice—here, tutors' knowledge, understanding, skills, attitudes, goals, beliefs, and pedagogy—thereby develops over time (Loveless et al. 2001). This complex process is not automatically triggered by adoption ICT or sharing information with colleagues. It entails

developing ideas and trying them out, considering the principles and purposes that support activities in particular contexts, and critical reflection.

Little research has analyzed perspectives on tutors' preparedness and adoption of ICT integration in teacher training colleges. A Canadian investigation by Goodson and Mangan (1995) and a British study by Selwyn (1999a) offer notable exceptions. Goodson and Mangan excluded the core subjects and focused on teaching styles and classroom organization. The main issue they identified around introducing classroom computers was that of 'congruence'. Teachers are considered to be reluctant to adopt a technology that seems incompatible with the norms of an antecedent sub-culture. Andrews (2000) claims that 'the subversive, humanities-based, liberal and book-dominated culture of English … is undoubtedly a factor in the resistance of English teachers to new technologies'.

The fast development of ICT necessitates a growing demand on educational institutions to use ICT to teach the skills and knowledge learners need in the 21st century era to fit in the global job market. Realizing the effect of ICT on the workplace and everyday life, today's educational institutions try to restructure their educational curricula and classroom facilities in order to bridge the existing technology gap in teaching and learning. This restructuring process requires effective integration of technologies into the existing environment in order to provide learners with knowledge in specific subject areas to promote meaningful learning and to enhance productivity (Tomei, 2005). Tutors therefore need to embrace the integration of ICT to empower learners to robust into the global world (UNESCO, 2002).This is because teachers in many countries in the world are working with learners who are growing up with ICT as a non-remarkable feature of their world (Facer, Furlong & Sutherland, 2003); Haddad & Draxler, 2002) as many of the fundamental assumptions that guided and shaped past thinking about modes of learning are inappropriate as the world is in the 21st Century.

Global investment in ICT to improve teaching and learning in schools have been initiated by many governments. For instance, in the United Kingdom, the government spending on Educational ICT in 2008-09 was 2.5b pounds, United States expenditure on K-12 schools and higher education institutions was $6 billion and 4.7 billion respectively (Nut, 2010) and in Newzealand, the government spends over $410 million every year on schools ICT infrastructure (Johnson, Calvert and Raggert, 2009). Despite all these investment on ICT infrastructure, equipment and professional development to improve education in many countries, Gulbahar (2007) observe that huge educational investments have placed little evidence of ICT integration and use in teaching and learning especially in Turkey. Evidence suggests that education sector is investing heavily on ICT but its integration is yet to impact on teaching and learning which has lagged behind the business sector (Stensaker, 2007), which is a similar case to the Kenyan scenario. Several surveys are carried out to investigate factors that are related to the use of computer technology in teaching and learning by teachers (Baek, Jong and Kim, 2008; Goktas et al., 2009) however, this is not on perspectives on tutors' preparedness and adoption to integrate ICT in primary teacher training which the current study sought to investigate.

According to UNESCO (2012), a wide range of educational ICT interventions initiated at institutional, provincial, national, regional and global level focuses on the enabling role of ICT in improving the quality of teaching and learning, expanding access to learning opportunities, promoting social equity in education and building inclusive "Knowledge Societies" across Africa and Middle East region. Moreover, the Teacher Education for Sub-Saharan African (TESSA) is a programme that creates open multimedia resources for Sub-Saharan African teachers and teacher educators. To date TESSA has introduced a BBC radio programme that debates the role of teachers in improving quality primary education and produced a tool kit for educators and planners on designing open and distance learning for teachers in Sub-Sahara Africa.

Integration of ICT brings revolutionary changes in teaching methodologies. The innovation lies not per se in the introduction and use of ICT, but in its role as a contributor towards students-centered form of teaching and learning (Smaldino, 2012; Ogange, 2011). In addition, it provides the tool needed by the'' information knowledge society''. Thus, teachers are inevitably presented with the demand to integrate ICT into teaching and learning to empower learners in this digital era. ICT allows us to collaborate, create, collect, store, disseminate, knowledge and resources all over the world (Ogange, 2011; Vrasidas, Zemblyas and Glass, 2009; Traxler, 2007 and Shih and Mills, 2007). With skills in ICT becoming a necessity that individuals have to acquire, educational institutions are left with the burden to provide a conducive environment to help the learners in the pivotal roles they are going to play in the knowledge and digital economy (Zindi & Aucion, 2005).

There is a sense of ownership for some subjects and an unfamiliarity and suspicion for others. In summary, two studies corroborate the notion that perspectives are an important influence in determining tutors' and students' use of ICT. No within-subject variation is described, although the strong likelihood of segmental differences within disciplines is acknowledged. There is also evidence that tutors choose ICT applications, activities, and approaches to fit their own perspectives on teaching and learning (Niederhauser and Stoddart 2001). Thus, pedagogic perspectives vary both within and between subject disciplines, and will influence the evolution of subject practice.

It is also notable that individuals' attitudes, confidence levels, cognitive and emotional styles, and social identities can influence their voluntary adoption in the use of ICT and this may apply to tutors as well as students. An increasing body of research indicates that gender and racial stereotyping, in particular, may not only result in inequities concerning differential access, level and nature of use, and perceived competence. These dynamics may also impact on the perspectives and adoption of subject cultures and their tendency to integrate technology, and, hence, could affect tutors' perceptions of agency and authority in working with colleagues to bring about change (Turkle 1995). It was beyond the scope of our analysis to investigate these issues, but we flag them as being of potential interest for further work.

Specifically, the study investigated how forms of digital technology are being used to carry out already familiar activities more quickly, reliably, broadly, productively, interactively, and how such use may be re-shaping these activities. In so doing, we analyze tutors' perceptions, adoption and constraining influences upon the use of ICT. This analysis culminates in a grounded model of how technology use might be successfully exploited and integrated into existing classroom practice, and how that practice is beginning to evolve. The implications for the traditional academic curriculum of introducing a powerful set of cross-curricular tools and resources were considered, along with the influences of established curriculum practice and policy upon tutors' willingness to develop new forms of activity and pedagogy.

By integrating ICT during regular classroom instruction, tutors demonstrate to the student teacher trainees the innovative ways of teaching and learning (Steketee, 2006). Countries like United States, Australia, Japan, Malaysia and Philippines have ongoing initiatives on ICT integration in education (Nut, 2010). Some have even created competency standards for technological use as observed by Bitter & Pierson (2005). However, integrating ICT in education is a complex process of educational change and the extent of integration in many countries Kenya inclusive; is extremely varied and in most cases very limited (Goktas et al., 2009; Orlando, 2009; Stensaker, 2007; Warwick and Swaffield, 2006). More and more critical voices are raised in the West and recently two observations were notably made: first there has been a disappointingly slow uptake of ICT in education even though heavy investments has taken place in improving access to technologies and improving skills of teachers and learners;

secondly there doesn't seem to have taken place an educational revolution in teaching and learning (Selwyn, 2007).

Gutterman et al. (2009) who explored practitioners' views from 26 countries on the main obstacles in implementation of ICT in schools highlighted ICT infrastructure as among the main barriers. Out of the ten barriers mentioned four were related to accessibility. These were insufficient numbers of computers, insufficient peripherals, insufficient numbers of copies of software, and insufficient simultaneous Internet access. The other related problem with ICT infrastructure has been the slowness of ICT systems, and scarcity of educational software in the school. Even in institutions where ICT facilities are available, poor choices of hardware and software and lack of consideration of what is suitable for classroom teaching are problems that still trouble many teachers (Newhouse, 2005 & Cox et. al., 2003).

The field of education has tried to exploit the web as a communication channel to connect distant learners with instructors (Moore & Kearsley, 2005) but Young (2002) has argued that though e-learning, learning has become an activity that is no longer set within programmed schedules and slots. It is embedded because the education systems in Africa region face endemic crises under the influence of widespread poverty, inequality, political regimes that range from dictatorships to democracies all of which toll on national education system (UNESCO, 2012). According to Omwenga (2008), integration of ICT will assist tutors to provide a variety whereas Muriithi (2005) observes that in Kenya, integration of ICT in education is still at limited stage and the NEPAD initiated pilot projects on ICT usage in Kenya is only in primary and secondary schools. Oredo (2008) studied the framework of evaluating ICT use in primary teacher education in Kenya. The Kenyan government is keen in rolling out integration of ICT into institutions (MOE, 2005; TIVET, 2011 and Hennessy et al., 2010). At the Ministry level, the government adopted its implementation framework on ICT integration in education, which was categorized into two portions. First, efforts of ICT policy review at a cost of 6.3 billion and provision of ICT infrastructure to institutions at a cost of 7.8 billion (MOEST, 2006).

Integration of ICTs has seen the government look at the various levels of education in the country differently in terms of policy formulation and implementation. Consequently, there has been a commitment by the MOE to provide the necessary ICT infrastructure to Primary Teachers Colleges (PTCs). Strategies and initiatives to realize the commitment are many even though not harmonized into a one unified government document. Most of these can be found in a number of documents including: National ICT Policy of 2006, the National ICT Strategy for Education and Training document, Kenya Educational Sector Support Programme document, Kenya ICT Trust Fund and the 2007 revised Primary Teacher Education (PTE) ICT syllabus prepared by Kenya Institute of Education (KIE). In appreciation of the need for Public Private Partnerships (PPPs) in equipping the PTCs with ICT infrastructure, the government has had a number of collaborations such as the New Partnership for Africa Development (NEPAD) e-schools programme and the World Summit on the Information Society (WSIS) whose objective was to integrate ICT in the delivery of education curriculum (MOE, 2006). Specific targets that were to be achieved by 2015 were linking colleges with ICTs and adapting curricula to meet the challenges of the information society (MOE, 2006).

An important step is an agreement to digitalize the curriculum under the KICD and NEPAD implementing connectivity to institutions (MOE, 2005). In addition, Farrell (2007) outlines specific e-learning resources that are to address the educational needs of primary and tertiary institutions. The Kenya ICT Trust Fund was established to mobilize and provide ICT resources to facilitate education and training through integration and innovation. Its general objective is to facilitate PPPs to mobilize and provide ICT resources to Kenyan public schools, community resource and learning centers. Integration of ICT is well captured in

Kenya's Vision 2030(Republic of Kenya, 2007). Kenya Vision 2030 wishes to see Kenya embrace technology and produce citizens that have skill and levels, which are globally competitive (Rotich, 2013). The same is highlighted in the Kenya Constitution 2010 article numbers 43, 53, 54, 55 and 56. The Kenya Institute of Curriculum Development (KICD) have developed an online teacher orientation courses using Elimika Learning Management Systems (LMS) whose main aim is to increase access to information on issues relating to the curriculum and curriculum delivery (Kenya Institute of Education, 2011). However, there are no clear guides on how integration of should done and whether teachers are prepared to integrate ICTs in primary teacher training colleges to roll out the same in Kenya primary schools.

Although these initiatives were set up as early as the year 2000 in Kenya, they have not addressed perspectives on tutors' preparedness and adoption of ICT in public primary teacher training colleges in Kenya. The pertinent question one would ask at this point is; is preparedness and adoption of ICT benefiting tutors in PTCs in Kenya? This is because tutors are implored to integrate ICT into teaching and learning activities, but perspectives on tutors' preparedness and adoption of ICT in teaching determines the effectiveness of the technology and not by its shear existence in the classroom (Kinuthia, 2009; Wong and Li, 2008). Therefore, this study sought to establish perspectives on tutors' preparedness and adoption of information communication technology in teaching and learning in primary teacher training colleges in Kenya.

Research Methodology

The study was conducted by using a descriptive survey design. The target population was tutors from public primary teacher training colleges in Central Region in Kenya. The study used proportionate sampling technique and Yamane formula to get the sample size. The findings of the study were discussed as follows.

Findings of the Study

The Relationship between the Tutors' Teaching Experience and their Adoption of Integrating ICT

It is obvious that for teaching and learning to be efficient and effective, integration of ICT is inevitable (Ogange, 2011). The findings of the study therefore revealed that the overall mean for the tutors' integration of ICT was established to be 3.09 with a standard deviation of 0.86.

Table 1: How often the Tutors Integrate ICTs to Teach

Technology (N = 43)	Every time	Once a week	Once a month	Once a year	Never
Text books	39 (90.7%)	1 (2.3%)	-	1 (2.3%)	2 (4.7%)
Overhead projector	3 (7.0%)	2 (4.7%)	2 (4.7%)	6 (14.0%)	30 (69.8%)
Black boards	39 (90.7%)	1 (2.3%)	-	-	3 (7.0%)
White boards	19 (44.2%)	5 (11.6%)	2 (4.7%)	3 (7.0%)	14 (32.5%)

Radio	-	1 (2.3%)	-	3 (7.0%)	39 (90.7%)
Television	3 (7.0%)	3 (7.0%)	2 (4.7%)	5 (11.6%)	30 (69.8%)
LCD	3 (7.0%)	4 (9.3%)	1 (2.3%)	5 (11.6%)	30 (69.8%)
Computer	9 (20.9%)	7 (16.3%)	2 (4.7%)	4 (9.3%)	21 (48.8%)
Tablets	1 (2.3%)	-	-	-	42 (97.7%)
Mobile phones	10 (23.3%)	5 (11.6%)	4 (9.3%)	5 (11.6%)	19 (45.2%)
Charts	16 (37.2%)	8 (18.6%)	4 (9.3%)	2 (4.7%)	13 (30.2%)

This implied that the tutors generally integrate ICT once a month in the likert scale for adoption of ICT. From the findings on correlation of the number of years the tutors had in teaching vis avis their adoption of integrating of ICT into their instructional process, the result gave a Pearson moment correlation value of r = 0.006, P-value = 0.967.

Table 2: A correlation Table Showing Relationship in Adoption of Integrating ICT to Tutors Experience

		Teaching experience in years	Adoption of integrating ICT into instructional process
Teaching experience in years	Pearson Correlation	1	.006
	Sig. (2-tailed)		.967
	N	43	43

This implied that, adoption of integrating ICT by tutors into their instructional process was not significantly related to their years of teaching experience. Waits and Demana (1990) observe that adoption of technology by teachers require professional development that focuses on both conceptual and pedagogical issues, on-going support in terms of ‘’intensive start-up assistance and regular follow-up activities” and a desire to change from within the profession whereas Charalambos and Glass (2005) view that an obstacle to ICT adoption is lack of teachers’ content, technology and pedagogical knowledge…teachers often fail to take advantage of what technology affords. According to Rotich (2013), provision of quality hardware is one of the factors that facilitate teachers’ adoption of technology in teaching.

Further, the study correlated the tutors teaching experience in years and how positively it influenced the use of ICTs for instructional purposes and the result showed that there was a significant relationship (r = 0.408, p-value = 0.007).

Table 3: Relationship in Teaching Experience in Years and How Positively it Influenced Use of ICTs

		Teaching experience in years	Previous teaching experience's positive influence to the use of ICTs for instructional purposes
Teaching experience in years	Pearson Correlation	1	.408(**)
	Sig. (2-tailed)		.007
	N	43	42

*** Correlation is significant at the 0.01 level (2-tailed).*

This implied that tutors who had longer experience in teaching were positively influenced in the use of ICTs in their instructional process. The researchers viewed therefore that the influence was both positive and negative. Better skilled tutors tend to use more diverse ICTs and on more regular basis than tutors who perceive lower ICT skills. This concurs with Maruti (2010)'s study on e-learning readiness among public primary teacher training colleges in Kenya. A crucial barrier to the integration of ICT is ICT competence or skills and ICT confidence. The finding is similar to Ford (2007)'s study. A very significant determinant of tutors' levels of engagement in ICT is their level of confidence in using technologies. This is why Ottenbreit-Leftwich et al.(2010) observes that technology integration is not always the best practice whereas Jones (2004) observes that age can influence the uptake of ICT for teaching. According to Cox et al. (2003), the way ICTs are used in lessons is influenced by teachers' knowledge about their subject and how ICT is related to it. College systems do not support integration of ICT by subject tutors. There is no ICT policy in colleges to give guidelines on integrating ICT.

Table 4: ICT Policy in the Colleges

College have ICT policy (N = 43)	**F**	**%**
Yes policy	19	44.2
No policy	21	48.8
No answer	3	7.0

Further, the government has not given clear guidelines on integration of ICT especially in PTTCs. This is why Ottenbret-Leftwich et al. (2010) argues that NEVER integrate technology for technology's sake. According to Olson (2000), the policy decisions and change models are highly politicized, and do not attend to culture of classroom practice and the pivotal role of the teacher effecting the change. The study established that tutors are not conversant with ICT systems being propagated by KICD. The findings concur with Gode (2013)'s study on factors influencing integration of ICT in teacher training colleges. Prensky (2001) distinguishes between ICT natives who are born in a digital world and digital immigrants who have to learn

the digital language and for whom ICT will always be the second language. Further, he notes that the tutors' subject domain may influence the use of ICT.

Tutors' Attitudes Towards Integrating ICT

Teachers play an important role in the implementation of ICT into schools and their attitudes are major predictors of the utilization of technologies in instructional settings (Al-Zaidiyeen, 2010).

The findings of the study show that there was no significant relationship between the tutors attitude towards integrating ICTs in teaching their subjects. The average attitude of the tutors in the study was calculated to be 1.64 with a standard deviation of 0.21 in the scale of 1 – 2 (1 = negative, 2 = positive). Using this scale, Analysis of variance (ANOVA) was conducted on the attitude of the tutors as determined by their integration of ICTs to teach their subjects and training on use of ICT. The study revealed that; integration of text books (F = 0.204, P- value=0.893), Overhead projectors (F = 0.389, P -value = 0.815), blackboard (F = 0.045, p- value= 0.669), Radio (F = 0.382, P -value= 0.685), Television (F = 0.225, P -value=0.922), LCD (F = 0.188, P- value= 0.943), Computer (F = 0.348, P- value = 0.843), Tablets (F = 0.534, P- value = 0.471), Mobile phones (F = 0.308, P- value =0.871) and Charts (F = 2.482, P- value = 0.063). The researchers therefore viewed that integration of ICT is not related with the tutors' attitude on integration of ICT. Jones (2004) observes that one key area of teachers' attitudes towards ICT is their understanding of how it will benefit their work and their students' learning. The study also revealed that the difference between the trained and those not trained was not significant. The researchers therefore viewed that tutors have a positive attitude on ICT use even though the principals were of the view that tutors were not positive to the concept of integrating ICT in teaching and learning process.

According to Mumtaz (2000), positive attitudes encourage less technologically capable teachers to learn the skill necessary for the implementation of technology-based activities in the classroom. Teachers' perception of technology use also is affected by their belief about the way the subject content should be taught. However, Mueller et al. (2008) observe that positive attitudes towards ICT on learning will not automatically lead to the uptake of ICT integration in teaching and learning. Further, the results of the study showed that there was a significant relationship in the skill level on integration of ICTs by student teacher trainees as they were being prepared as teacher professional. It further revealed that student teacher trainees who had negative attitude towards integration of ICTs had no skill at all even though Judson (2006) observe that there is little correlation between stated beliefs and the actual practice.

Challenges Faced by Tutors while Integrating ICT

The study explored the challenges using factor analysis and through tabulation of the Eigen values, presented the findings in table 5.

Table 5: Total Variance Explained

	Initial Eigen values			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.738	28.970	28.970	1.738	28.970	28.970
2	1.373	22.881	51.851	1.373	22.881	51.851
3	1.044	17.395	69.246	1.044	17.395	69.246
4	.821	13.688	82.934			
5	.606	10.096	93.030			
6	.418	6.970	100.000			

Extraction Method: Principal Component Analysis.

From Table 5, there are 6 components/factors that are challenges to integration of ICT. The variances of these factors are the Eigen values associated with each factor representing the variance explained by that particular linear component and they also explained in terms of that particular linear component (Gupta, 2006). The first few variables explain relatively large a mounts if variance and that they are also displayed in terms of the percentage variance (so factor 1 explains 28.970% of the total variance). The first few component/factors explain relatively large amounts of data whereas subsequently factors explain small amounts of variance. Each component/factor is based on correlated with Eigen value greater than 1, is considered to have a significant influence on the dependant variable. Moreover, we extract all the factors with the Eigen values greater than 1 which leave us with 3 factors.

When components were correlated, sums of squared loadings could not be added to obtain a total variance. The Eigen values associated with these three factors were displayed and the percentages of variance explained as Extraction Sum of Squares Loadings. The three factors explained relatively large amounts of variance especially factor 1 whereas the subsequent factors explained smaller amounts of variance. Rotation has the effect of optimizing the factor structure. The last cumulative percentage of variance in the rotation sums squared loading is 69.246%. This showed that the three factors were influenced up to 69.246% of challenges of integration of ICT in teaching and learning.

The findings of the study revealed a heap of challenges such as; inadequate facilities, lack of competence, knowledge and skills in ICT integrations, limited time for accessing the computer in the college, power blackout, lack of support from college administration and government, college systems do not embrace integration in all subjects, inadequate training, lack of enough ICTs and negative attitude of students, low levels of ICT literacy among tutors especially on use of modern ICTs, lack of appropriate and relevant content from publishers and the ministry, apathy on usage of ICT in teaching learning process, some tutorial ignore using the ICT facilities available and initial preparation time is too long. The finding concurs with Gode (2013) and Maruti (2010)‘s studies.

Conclusion and Recommendations

The main question that this study endeavored to answer was perspectives on tutors’ preparedness and adoption of ICT in public teacher training colleges in Kenya. Based on the findings of the study, the following conclusions were made: That there was lack of training opportunities for the staff on integration of ICT in the process of teaching and learning which

impedes a great deal the rolling out of integration of ICTs in the process of teaching and learning, adequacy of ICTs influences adoption of ICT in the process of teaching and learning. Integration therefore should go beyond the use of basic computer packages/skills and textbooks for delivering subject specific content and that teaching experience influence integration of ICT in the process of teaching and learning. This factor would be mitigated by policy and frequent training of tutors in teacher training Colleges on use of ICT in teaching and learning if integration of ICT has to be realized in Kenya.

Recommendations

Based on the findings of the study, the researchers recommend that:

1. PTTCs to provide tutors with regular trainings and seminars on how to integrate ICT in the teaching and learning process. The refresher courses/training be on regular basis.
2. PTTCs should adopt policies that guide them on integration of ICT in the process of teaching and learning. One of the mandatory policies to be adoption of appraisal practices to ensure that tutors are rewarded for integration of ICTs in teaching and learning process, and ensure online ICT competency for both tutors and student teacher trainees.
3. The Ministry of Education should develop an ICT policy on integration of ICTs in teaching and learning for PTTCs and ensure it is implemented to the latter.
4. The KICD should come up with clear guidelines on integration of ICTs in PTTCs together with relevant content on the same if Kenyan outputs from PTTCs have to be relevant with the demands of the global job market.

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