

# Status of Institutional Preparedness for Adoption of E-Learning in Teacher Training Colleges in Kenya

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## Abstract

The purpose of the study was to assess the level of preparedness for adoption of e-Learning strategy in Primary Teacher Training Colleges in Kenya. The objectives of the study were to: Determine the level of availability of ICT infrastructure; establish the level of accessibility to e-Learning resources; establish the ICT competency level of teachers and to examine the nature of supportive strategies in place to support e-Learning. Descriptive survey design was used. Sample size was 175 teachers determined by use of Krejcie and Morgan (1990) standardized tables. Simple Random sampling was used to obtain samples from five Teacher Training colleges. Questionnaires and observation checklist were utilized to collect both qualitative and Quantitative data. Data was analyzed by use of descriptive statistics aided by Statistical Package for Social Sciences. From the study, over 86.8% of colleges have not acquired e-learning infrastructure, 62.1% of teachers have basic level ICT skills while most of PTTCs have hardly put in place strategies to support e-learning. The study recommends for an urgent policy dialogue with a view to the development of a comprehensive policy on e-learning for teacher education in Kenya. The Government of Kenya and other stakeholders need to work towards provision of essential infrastructure and training of teachers to enable use of e-learning in Primary Teacher Training Colleges in Kenya. The study generated useful information that can influence policy direction in relation to resource planning for implementation of e-learning in educational institutions in Kenya and other developing countries. From the empirical literature reviewed, it appears that studies do not adequately address issues related to the topic. It is therefore useful to conduct further research in this area, especially in private Teacher Training colleges and other higher levels of learning so as to generate concrete data to inform policy decisions.

**Keywords:** e-Learning, Communication Technology, Infrastructure, strategy, Preparedness

## 1. Introduction

Globally, evidence indicates that more than 10.3 million teachers are required to enable countries to attain the 2015 EFA targets, Sub-Saharan Africa requires over 4.5 million teachers (63%) (UNESCO Institute for Statistics, 2012). Extreme teacher shortages has been experienced in Eritrea (24.0%), Central African Republic (21.2%), Chad (16.0%), Burkina Faso (13.8%), Malawi (13.6%), Mali (14.4%), Niger (14.1%) and Côte d'Ivoire (12.4%) (UNESCO,2015). Tanzania requires over 85,000 teachers to cope with the demand for secondary education (Retrieved on 17th August 2014 from <http://www.elearning-frica.com/newsportal>). Due to financial constraints in Kenya, teacher shortages in public institutions increased from 61,235 in 2010/2011 to 75,574 in 2012 and is expected to grow by 17% by 2015 (RoK, 2012). To cope with rampant teacher shortages, countries such as Guinea-Bissau, Niger and Togo have resulted to hiring unqualified contract teachers (UNESCO, 2015). UNESCO laments that expecting conventional education delivery strategy to ensure equity in access to quality education for all at affordable costs by 2015 in the current economic constraints is just but an illusion.

In the World Education Forum in Dakar in 2000, the potential of harnessing ICT as a vehicle for delivering the EFA goals as highlighted in item 169 (strategy number ten) (UNESCO, 2015). Attended by over 164 governments and their representatives, the legislators agreed to support their countries in provision of ICT infrastructure and capacity building in education (UNESCO, 2015). While adopting the Millennium Development Goals (MDGS) in 2000, the world leaders drew attention on the urgency of countries to enable access of ICT infrastructure to their citizens so as to reap the benefits therein.

E-Learning has been categorized as one specialized application of Information and Communication technologies that could be used to supplement conventional teaching and learning processes. Scholars have defined e-learning differently, depending on contexts in which it is adopted. The Organization for Economic Corporation and Development ([OECD], 2005) views e-Learning as the use of ICT to enhance or support learning in tertiary institutions, either as Web supplemented; mixed or fully depended on internet, while Rosenberg (2001) defines e-Learning as “the use of Internet technologies to deliver a range of solutions to enhance knowledge and performance” (p.28), whereas the Ministry of Education ([MoE], 2005) classifies e-Learning as one of the distance learning approaches that uses computer-enhanced learning.

In whichever way it is defined, the primary objective is the application of ICT tools in teaching and learning process, including the use of internet (Garrison, 2011). E-Learning can be offered in four distinct ways,

namely: individualized self-paced online, individualized self-paced offline, group-based synchronously or group-based asynchronously (Romiszowski, 2004). Since the use of internet is a critical factor in application of e-learning, infrastructure for internet connectivity, digital resources and human resource are essential (Tinio, 2002).

### **1.1. The concept of Preparedness**

Technological revolution is transforming the way higher education is being accessed (Garrison, 2011). However, effective application of new technologies in education requires institutional preparedness as a pre-requisite. An E-ready society is one that has acquired the essential physical infrastructure and software which is accessible to the staff and students. Some of the instruments that has been developed to measure the level of institutional preparedness for application of e-Learning include infrastructure access and internet connectivity, culture, Capability, e-content such as online digital materials and policy; Information security; Human capital and financial stability and existing education system and adequate content to adapt to new ways of learning (Chapnick, 2000; Center for International Development, 2006; Haney, 2002; UNESCO, 2010).

Assessment of preparedness provides key quantifiable information indicators for a country's situation, forms a basis for comparison and future planning (ITU, 2010; CID, 2006). It has been established that appropriate whole-school strategies make a significant contribution to a supportive ecosystem for innovative e-learning practices in schools (UNESCO, 2015). The shift to e-learning strategy requires creation of clear vision and mission for the institution so that digital content can be aligned with the mandated curriculum, with of consideration the diversity of learner's needs. The need for plans for technological sustainability is essential as it is well document that technology becomes obsolete very fast (Anderson, 2010; MoE, 2009).

### **1.2: Study Justification**

Kenya ranks among the highest African countries in terms of ICT skills development and has emerged as an African ICT hub, a head of South Africa and Egypt (ITU, 2013) making it to earn itself the adage, "the Silicon Savannah of Africa" (The 1st 2002-2014 African consortium, 2014.p.159). Although Kenya became the first country in SSA to introduce digital content in schools by 2009, evidence indicates that the current use of the e-Learning strategy is still patchy, where only 10% of schools use e-Learning while over 60% of ICT infrastructure lie underutilized. Failure to utilize the equipment not only leads to wastage of scarce resources, loss of the potential benefits associated with new technologies and opportunity costs in redundant physical capital, but also has negative reputation for future investment in similar ventures. Although much emphasis has been given to installation of infrastructure in schools and learning institutions the literature reviewed showed that most of the key ICT initiatives in education in Kenya have been directed to secondary schools or in the universities, with little attention given to PTTCs.

Kashorda and Waema (2009) however points out that most higher education institutions in Africa have not yet assessed the level of preparedness due to the fact that the leadership is not yet convinced on the role of ICT in education. Haddad et al. (2002) quips that "The introduction of new technologies without infrastructure and competent teachers to make use of them is like building roads but not making cars available to use them" (p.58). As the country prepares to implement the ambitious laptop project in all primary schools to utilize e-learning platforms by 2015, it is imperative to examine the level of access to infrastructure and competency level of teachers in PTTCs. The purpose of the study was therefore to determine the level of ICT infrastructural resources available Primary teacher training Colleges, assess the level of accessibility of ICT resources among teachers, to establish teachers' ICT competency levels and to examine the extent to which supportive strategies have been put in place to promote adoption of e-Learning strategy.

### **1.3: Theoretical Framework**

As technology is evolving, the study was guided by endogenous growth theory of technological change developed by Romer in late 1980s and early 1990s. The endogenous growth theory was complemented by use of Human capital theory to explain the role of skills development in relation to ICT application. According to endogenous growth theory, a country's capacity to take advantage of knowledge economy depends on the level of the knowledge accumulation in skills and infrastructural development. Romer (1986) views technology as a special capital input that enhances creation, storage and distribution of knowledge as a factor of production.

### **2.0: The potential of e-Learning**

E-learning has a multiplier effect in that it offers unprecedented opportunities that effectively narrow the long-existing learning divide and promotes equity and quality of education. Tella and Tella (2001) assert that education systems have an obligation to deliver on public expectations of quality education for economic growth and social development. The use of ICT to improve the quality of learning in higher education has been a long-standing debate. UNESCO(2015) considers ICT as a tool that can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers' professional development as well as

improve education management, governance and administration provided as long as the right mix of policies, technologies and capacities are in place.

The use of ICTs offers new ways in which the quality, effectiveness and flexibility of higher education can be improved (Farrell et al., 2007). The flexibility of e-learning leads to elimination of geographical and cultural boundaries enables learners in diverse learning environments such as those constrained by social barriers such as girls and women, marginalized poor facing resource constraints and people with disabilities to access quality education, (UNESCO,2015). Furthermore, learners are not required to attend college physically; instead, the college comes to them, hence travel, accommodation and time costs are minimized (Haddad et al., 2002). Students with various conditions such as those in need of remedial, high achievers and gifted students can access education on self-study basis. Table 2.1 shows some of the potential benefits of e-learning in education.

**Table 2.1: Potential benefits of e-learning in education**

Stakeholder	Potential Benefits
<b>Private benefits</b>	<ul style="list-style-type: none"> <li>• Increased access to education due to flexibility and ubiquity of content</li> <li>• Immediate feedback;</li> <li>• provides student-centred individualized mode;</li> <li>• Collaboration with other learners and trainers for consultation.</li> <li>• High quality offered across different groups;</li> <li>• Enable lifelong and life-wide learning</li> </ul>
<b>Public benefits</b>	<ul style="list-style-type: none"> <li>• Increased capacity building and cost-effectiveness of education and training systems;</li> <li>• enhances flexible content development</li> <li>• Delivery to reach large marginalized groups;</li> <li>• Enables Quality improvement by sharing and updating of e-content;</li> <li>• Ensures collaboration among institutions through internet</li> <li>• Promotes opportunities for lifelong learning.</li> </ul>

**Source: UNESCO (2002).**

UNESCO (2015) points out that unleashing the potentials of e-learning requires well-planned policies and strategies, provision of infrastructure aligned with content development. The institution's capacity to use technology depends not only on level of infrastructural development but also on level of teacher ICT-competency (Bashar &Khan, 2007). Teachers play an important role as developers OER and are also instrumental in the use of OER in the teaching and learning process. According to UNESCO (2016), building the capacities and capabilities of teachers to effectively develop OER is essential for use of e-learning strategy. The learning content is no longer static, meaning that it can be changed, annotated, commented on and updated, making the notion of a 'final version' old fashioned, hence, learners and teachers need new skills, key capabilities and flexibility to navigate the 21st century learning environments(The e-learning Africa Report 2012).

Haddad et al. (2002) points out that adoption of technology require planning and therefore should not be "inserted into schools as an afterthought and should be conceptualized and designed with participation of stakeholders (p.60). The development of digital content, its regular updates to ensure that the learners keep abreast with educational and technological trends has been critically emphasized in the planning phase of e-learning initiatives. The identified forms of content that can be accessed through OER include Teachers Instructional Manual (TIMS), Student Instructional Manual (SIMS) and interactive computer software, database repositories and Web portals are in place to enable learners to access to it at their convenience (Bates, 2001, Haddad et al.,2002).

UNESCO (2009) urges policy makers to develop supportive policy environment and framework for the integration of ICT into their education systems at national level. Garrison (2011) concurs that for effective adoption of e-learning adoption requires a clear and realistic vision in place, clear policy goals and objectives and an expenditure plan for infrastructure implementation, maintenance and readiness to acquire standardized quality-assured digital content. Further, regulatory policies related to access to OER, security and user ethics should be aligned with institutional strategic plans (Anderson et al., 2004; Haddad et al., 2002). According to OECD (2010), many educational institutions both in developed and developing countries are yet to develop comprehensive policies for use of technology in schools. Hence the study sought to establish the level of institutional preparedness for adoption of e-learning in Primary Teacher Training Colleges in Kenya.

## 2.1: Technology in Primary Teacher Education in Kenya

Teacher education plays a central role in the production of human capital for economic growth of a country. Primary Teacher Education (PTE) is a two year program that prepares teachers for the implementation of primary school curriculum. Currently, the country has 22 public and 97 private PTTCs (MoE, 2014). The

government intends to make education sector the natural platform to equip the nation with ICT skills for creation of dynamic society and sustainable economic growth. Some of the initiatives towards this end include the promulgation of ICT policy in 2006 after many failed attempts since 1980s. The objective relevant to education in the ICT policy is to “Encourage the use of IT in schools, colleges, universities and tertiary institutions to improve the quality of education”, including technology in Primary teacher training colleges (PTTCs) in Kenya (RoK, 2006.p.10).

The MoE came up with a sector ICT vision that focused on adoption of ICT as a universal tool for education and training (MoE, 2006). To achieve the vision,...‘every educational institution, teachers, learners and the respective community will be equipped with appropriate ICT infrastructure, competencies and policies for usage and progress’(MoE, 2006.p.14; RoK,2005). The Kenya Vision 2030 Flagship for Education and Training emphasizes on establishment of a computer supply program for equipping students with ICT skills to raise the quality and relevance of education (GoK, 2007). Although ICT in PTTCs infrastructure development was mandated to the leadership of USAID funded project which was planned to be completed by 2012 (Swarts & Wachira, (2009), Sessional paper No.10 of 2014 however acknowledges that the country “has no approved structured ICT professional training program and the training is carried out through a series of mentoring training programs conducted by senior ICT professionals”(RoK, 2014.p. 46). It has been argued that successful adoption of ICT in education depends largely on capability of teachers to assimilate new technologies in their teaching process. The level and nature of teachers’ ICT training determines their competency in application of ICT in pedagogical processes (Farrell, 2007).

### **3.0: Design and Methodology**

The study adopted cross-sectional survey design using a combination of quantitative and qualitative approaches. The choice of survey design was motivated by the fact that the design captures snapshots of current practices and situations and is widely used to gather self-reported opinions beliefs attitudes and behaviours using similar instruments for all participants and enables observation of large number of variables in the target population (Cohen, et al., 2007; Creswell, 2013). The study was carried out in the 22 public PTTCs which are distributed across the country. The PTTCs offers a two year course for teachers meant to teach in primary school level. The study involved five colleges selected based on regional representation. Simple random sampling with replacement was used to select 175 out of a total of 306 teachers. Data was collected by use of Self-completion semi-structured questionnaires and observation checklist.

### **3.1: Data Analysis**

Quantitative data was cleaned up, edited, coded, classified and reduced appropriately to eliminate incomplete questionnaires as recommended by Gay et al. (2009). Processed data was entered into the computer coding sheets according to research questions and counter-checked to correct erroneous entries. Data was analyzed by use descriptive statistics (means, standard deviations, percentages and frequencies) aided by use of Statistical Package for Social Sciences (SPSS version 20) software programme. Social science research in recent years have emphasized on moral issues where researchers have an obligation to respect and protect those involved in their studies (Cohen et. al., 2007).For this reason, logistical and ethical considerations regarding informed consent, voluntary participation, confidentiality and anti- plagiarism measures taken.

### **4.0: Findings and Discussions**

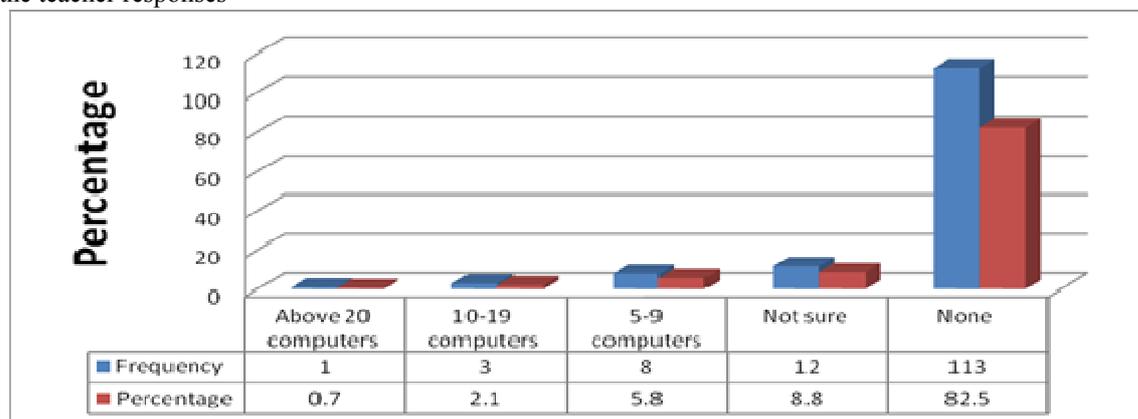
Educational institutions acknowledge that they must move apace with the technology driven changes in society and economy (Tinio, 2002). In line with the international commitments, the government of Kenya has set out to provide infrastructure to all schools, universities and middle level colleges, prioritize the provision of equipment and training across all County and sub-county offices to ensure real time information sharing is in place by 2015 (RoK, 2014). The existing e-learning readiness models (Chapnick, 2000; World Bank, 2005; CID, 2006) suggest that ICT infrastructure is crucial to the success of implementing e-learning. One of the objectives of the study was to assess the level of availability to ICT infrastructure for adoption of e-learning in the PTTCs. The responses on availability of various resources are presented in table 4.5.

**Table 4.5: Availability of Specific Resources in PTTCs**

E-learning resources	N	Minimum	Maximum	Mean	Std. Dev.
Desktop Computers/laptops	137	1.00	5.00	4.037	0.963
Internet connectivity everywhere	137	1.00	5.00	3.151	1.42399
LCD projectors	137	1.00	5.00	3.937	0.939
Interactive white boards	137	1.00	5.00	2.301	1.48719
Digital storage facilities such as flash disks, CD ROMS	137	1.00	5.00	2.436	1.204
Specific e-books for reference	137	1.00	5.00	2.761	2.37470
Database repositories	137	1.00	5.00	2.768	1.34625
Digital content for all subjects	137	1.00	5.00	2.458	1.29641

**Source: Teachers' Questionnaire**

From responses on table 4.5, the facilities rated to be highly available were the desktop/ laptops computers as reflected by a mean of 4 (the strongly agree/ agree category of the likert scale) and LCD projectors (Mean of 3.937). Other facilities such as digital storage facilities, Interactive White Boards, and digital content for all subjects, e-books for reference and database repositories were lacking in all colleges as indicated by an overall mean of less than 3. Specifically, none of the colleges had Specific e-books for reference, database repositories or any interactive white boards. The inadequacy of infrastructure and facilities implies that PTTCs may hardly use e-learning whether the teachers possess the essential skills or not. The study sought to establish the number of computers whether desktop or laptops that were available for use in teaching. Figure 4.7 presents the teacher responses



**Figure 4.7: Availability of computers for teaching and learning**

**Source: Teacher questionnaire**

From Figure 4.7, majority of teachers (82.5%) said they had no computers for teaching, only a few teachers (5.8%) reported to have some computers ranging from 5-9, while 8.8% were not sure whether such facilities existed. Only 2.8% of respondents reported to over 20 computers for teaching. From the interview guide, 80% of the ICT directors concurred with information given by teachers that the only available computers were those for teaching computer as a subject, otherwise, PTTCs lacked infrastructure for adoption of e-learning strategy. The current scenario is surprising bearing in mind that there been continuous discourses on provision and supply of ICT equipment in PTTCs as reflected on the successive policy documents, outcomes are yet to be realized.

Internet connectivity is one of the indicators and pre-requisites for of an e-ready institution as it adds great value to an institution's technology resources(Anderson, 2010) and enables teachers and students to communicate and collaborate with peers, colleagues and experts and also access teaching resources online (ITU, 2013; Tinio, 2002). The research therefore sought to assess the extent of internet connectivity in the colleges. The teachers were asked to state the extent of internet connectivity in their colleges and their responses have been summarized on Table 4.6.

**Table 4.6: Teachers' Opinion on the Extent of Internet Connectivity in PTTCs**

Extent of internet connectivity	Frequency	Percentage
Not connected at all	9	6.6
Everywhere within the compound	2	1.5
Computer room only	43	31.4
Most offices	71	51.8
In classrooms	0	0
Learning Resource Centres	12	8.8
<b>Total</b>	<b>137</b>	<b>100.0</b>

Source: **Teachers' questionnaire**

The data presented on Table 4.8 indicates that in most PTTCs (83.2), internet connectivity is mainly found in offices and in computer rooms. Only few colleges (8.8%) have internet connectivity in Learning Resource Centres, while some of them (6.6%) have no internet connectivity at all. The results also show that very few PTTCs (1.5%) have internet connectivity available everywhere within the compound. From the study findings, over half (51.8%) of the internet connections is in offices, use of the facility for teaching and learning process may not be possible. Although Dutta & Bilbao-Osorio( 2012) asserts that Africa lags in terms of level of ICT readiness among world regions as measured in terms of internet connectivity and access, usage, competency development and affordability, the internet penetration in Kenya is rated at 36.7%, slightly behind Nigeria (37.6%), South Africa (46.88%) and Egypt (48.3%). From the findings however, internet penetration in the education sector (particularly the PTTCs) is lagging behind in terms of internet penetration.

From the findings, despite different initiatives such as the Global e-Schools and Communities Initiative established by the United Nations (UN) ICT Task Forces since 2003 to deploy ICT in schools for improvement of the quality of teaching and learning in developing countries, digital divide still exist in Kenyan learning institutions. Internet connectivity being one of the indicators of an e-ready society for e-learning, low level of penetration in PTTCs implies high level of digital divide, hence low adoption of e-learning strategy.

### 5.0: Implications of the Study

The purpose of the study was to assess the level of institutional preparedness for adoption of e-learning strategy in PTTCs in Kenya. From the findings, it has been established that majority of the teachers(51.8%) have only acquired basic ICT skills that can only be used to perform basic activities, while over 35% have no formal training at all. Furthermore, most of the teachers (87%) were dissatisfied with the way the trainings were conducted. From the findings, a large percentage of the teaching workforce is only trained on basic computer skills and the competency level is generally low. Based on the findings, teachers in PTTCs are hardly prepared for adoption of e-learning strategy, hence, the need for continuous professional development in essential ICT skills.

The study recommends for a comprehensive review of the existing ICT policy of 2006 to specifically address the issues of access and teacher competency gaps currently experienced in PTTC level of education in Kenya. The government and other stakeholders should provide PTTCs with adequate e-learning resources.

Further, a similar study should be carried out in private PTTCs levels of education and other levels of education. This will enable policy-makers to plan for n of resources allocation on needs basis.

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