

# **An Investigation into Implementation of ICT in ECD and Primary Schools, in the Light of Free Laptops at Primary One: a case study of teachers implementing ICT into their teaching practice**

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## **Abstract**

Information and communication technologies (ICTs) have been touted as being potentially powerful tools that can be used to facilitate the implied educational change and reform. Implementation of ICT in higher education learning environments is a complex task. Teachers and students, but also management, administration and ICT support are affected by and affect the implementation. To facilitate the change processes better the first step is to actually understand what problems and challenges implementation of ICT leads to and how it affects practice. Although classical instructional methods will continue to be used in the teaching-learning process, it is also true that Information Communication Technologies (ICTs) can be harnessed to become powerful pedagogical tools. Proceeding from the premise that there are many ways to use new technologies for teaching and learning, the paper presents literature on the possibilities and challenges of integrating ICT into teaching-learning, the rationale for adopting and using ICTs for learning-teaching, as well as the key factors that influence the adoption and use of ICTs in teaching and learning both from a general perspective and in a technical education context. The paper then outlines and discusses findings of a study designed to investigate the possibilities and challenges of using Information Communication Technology (ICT) in teaching-learning procedures in primary school institutions in Kenya using data obtained from a Tinderet District school in the Rift valley

**region of Kenya. It examines views in pertinent literature as well as teachers' perceptions of the benefits of integrating ICT into teaching-learning, the success factors and obstacles encountered in their endeavours to do this. Conclusions are drawn and suggestions made to address the challenges and improve on the use of ICT for teaching-learning in teaching institutions.**

**Keywords:** *ICTs, implementation, teaching-learning, challenges, possibilities*

## **Introduction**

The emergence of a new global economy, which has resulted from globalization and technological change, has serious ramifications for the nature and purpose of educational institutions. Schools can no longer remain mere venues for the transmission of a prescribed set of information from instructor to learner. Schools' current challenge is to promote "learning to learn"; i.e., the acquisition of knowledge, values, attitudes and skills that make possible continuous learning over the lifetime (Commonwealth of Learning - COL, 2003). For the purposes of this paper, ICT is defined to include all technology for the manipulation and communication of information. Sometimes used interchangeably with Information Technology, ICTs constitute an assorted set of technological gadgets and resources used to communicate, and to create, manage, store, and disseminate information, examples of which include computers, the Internet, broadcasting technologies, and telephony. ICT integration in education suggests the application these technologies to enhance the quality of teaching and learning in institutions (United Nations Educational, Scientific and Cultural Organisation - UNESCO, 2005).

The computer, which is an important component of ICT, provides powerful tools to inform decision-making, improve education policies and practices, and promote lifelong learning. It is generally held that computers can empower teachers and learners, advance change and foster the development of '21<sup>st</sup> century skills' (Trucano, 2005). There is widespread belief that computer technology can and will empower teachers and learners, transforming teaching and learning processes from being highly teacher-dominated to student-centred, a transformation expected

to result in increased learning gains for students, creating and allowing for opportunities for learners to develop their creativity, problem-solving abilities, informational reasoning skills, communication skills, and other higher-order thinking skills.

ICTs in education are featured in different modes some of which include open and distance learning, e-learning, teleconferencing, and blended learning (Tinio, 2008). Open and distance learning is defined by the Commonwealth of Learning (2003) as formats of providing learning opportunities that is marked by the separation of teacher and learner in time or place, or both time and place. E-learning (also termed ‘online learning’) encompasses learning at all levels, both formal and non-formal, that uses an information network whether wholly or in part, for course delivery, interaction, evaluation and/or facilitation. Teleconferencing refers to “interactive electronic communication among people located at two or more different places” (Rao, 2008), while blended learning is a new term that is used to refer to learning models that combine traditional classroom practice with e-learning solutions.

The potential of each technology varies according to how it is utilized. Haddad and Draxler (cited in Tinio, 2008) have identified at least five levels of ICT use in education: presentation, demonstration, drill and practice, interaction, and collaboration. Each of the different ICTs may be used for presentation and demonstration, the most basic of the five levels. Except for video technologies, drill and practice may likewise be performed using the whole range of technologies. Networked computers and the Internet are the ICTs that enable interactive and collaborative learning best; their full potential as educational tools will remain unrealized if they are used merely for presentation or demonstration.

Kenya has made remarkable progress in promulgating an ICT policy framework and implementation strategy, complete with measurable outcomes and time frames (Farrell, 2007). In January 2006, Kenya put in place a National ICT Policy, whose aim is to advance the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and reasonably priced ICT services (Kenya Ministry of Information, 2006). Many education institutions in Kenya have started to leverage the Internet to improve their programme’s reach and quality. An example is the African Virtual University (AVU), initiated in 1997 at Kenyatta

University. It uses satellite and Internet technologies to provide distance-learning opportunities to individuals in various English-speaking and French-speaking countries throughout Africa (Amutabi, 2003).

One of the strategies related to the implementation of Kenya's ICT policy seeks to create awareness of the opportunities offered by ICT as an educational tool to the education sector (Farrell, 2007). It was against this background that this study was designed to see whether this awareness has been achieved in primary schools institutions in Tinderet Constituency. Tinderet constituency has 105 public primary schools with 700 TSC teachers and 17 private schools. The following 5 schools were found to have at least 1 computer each. The Tinderet primary schools, Kimatgei primary, Kibukwa primary, Kabunyaeria and SDA Labuiwa primary school. Tinderet primary school was taken as a case to be investigated.

The study sought to address the following questions:

1. What possibilities do ICTs offer teachers in teaching-learning processes?
2. To what extent do teachers use ICT as a tool for managing teaching-learning?
3. What challenges do teachers face as they integrate ICT into teaching-learning processes?

## **Methodology**

This study made use of a descriptive survey design, which involved the use of a questionnaire. Answers to the first question were obtained by reviewing relevant books, journals, internet sources, and other relevant material in order to establish the different possibilities of using ICT in teaching-learning. The questionnaire was designed to gather information on teachers' perceptions of the extent to which they integrate ICT into teaching-learning, and their perceived challenges in this endeavour. The school was purposively selected from among others in the western region of Kenya. Survey design is basically concerned with describing the characteristics of a particular individual or of a group (Babbie, 2010). Since the research sought to describe and account for existing conditions relating to the training of teachers to use ICT in education, a descriptive survey design was deemed appropriate.

From the total population of about 80 teachers at district who have basic computer training (according to DEO's official records), a sample of 26 teachers were selected to participate in the study. This was done using stratified random sampling, so that identified subgroups (six academic departments) in the population were represented in the sample in the same proportion in which they exist in the population (Gay, Mills, & Airasian, 2006).

The instruments used in the study were piloted in different institutions within the region. This was done to guard against interaction of the pilot group and the study sample, which would compromise the results. The reliability of the questionnaire was tested using test re-test method. The questionnaire was administered twice to the pilot participants with a span of two weeks in between, and a reliability index (0.72) was obtained. This was considered acceptable since Koul (1984) has posited that a reliability index of 0.50 and above is acceptable.

## **Results**

The following tables depict data on teachers' perceptions of their use of ICT in managing curriculum. In the tables, F represents frequency count.

**Table 1: Teachers' Perceptions of the Extent to Which They Use ICT in Curriculum Management**

Area of ICT use	Response					
	Agree		Undecided		Disagree	
	F	%	F	%	F	%
As a tool for managing curriculum.	17	69.4	4	16.7	5	13.9
To enhance students' interest in learning	18	50.0	4	11.1	14	38.9
To ease handling of student information	26	72.2	5	13.9	5	13.9
To enhance lesson preparation	26	72.2	1	2.8	9	25.0
To manage learning resources	24	66.7	3	8.3	9	25.0
To facilitate student assessment	21	58.4	5	13.9	10	27.7
To make timetabling easier	22	61.1	4	11.1	10	27.8
For communication	21	58.3	4	11.1	11	30.6
To extend access to education	10	27.8	3	8.3	23	63.9
To ensure equity and inclusion	12	33.4	7	19.4	17	47.3

The results indicate that teachers in primary school institutions generally view ICT as an appropriate tool for curriculum management (69.4%). More than half of the teachers generally held that they use ICTs in all the areas for demonstration, with the exception of extending access to education (27.8%) and ensuring equity and inclusion (33.4%). This is an indicator that teachers have embraced ICT as a tool for managing curriculum, notably to ease handling of student information (72.2%), to enhance lesson preparation (72.2%), to manage learning resources (66.7%), to facilitate student assessment (58.4%), to make timetabling

easier (61.1%), and for communication (58.3%). However, although half of the teachers did indicate that they use ICT to enhance students' interest in learning, a significant proportion (38.9%) disagreed with the statement with 11.1% having been undecided. Nevertheless, it is concluded that, broadly speaking, lecturers in technical training institutions regard and use ICT as an appropriate tool for managing teaching-learning.

**Table 2: Teachers' Perceptions of Challenges of implementing ICTs into Teaching-learning**

Challenge	Response					
	Agree		Undecided		Disagree	
	F	%	F	%	F	%
1 Teachers are required to use ICT in curriculum management.	18	50	7	19.4	11	30.6
2 I have sufficient training to enable me integrate ICT in teaching-learning.	18	50	5	13.9	13	36.2
3 The number of ICT equipment for teachers' use is adequate.	7	19.5	3	8.3	26	72.3
4 Adequate support is provided by administration to enable teachers integrate ICT in teaching-learning.	15	41.7	5	13.9	16	44.4
5 There is a clear institutional policy regarding the use of ICT.	16	44.4	4	11.1	16	44.5
6 There are procedures for monitoring and evaluating teachers' use of ICT in curriculum management.	12	33.3	5	13.9	19	52.8
7 Internet connectivity is not a problem in my institution.	33	91.7	1	2.8	2	5.6

8	I take advantage of internet connectivity to obtain web-based learning materials.	31	86.1	2	5.6	3	8.3
9	Adequate technical support is provided teachers' to use ICT.	19	52.8	7	19.4	10	27.8
10	Teachers' are enthusiastic about ICT.	15	41.7	8	22.2	13	36.1

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The findings in Table 2 indicate that the greatest challenge that teachers' face is unavailability of computers. Only 19.5% of the teachers responded that the number of ICT equipment for teachers' use is adequate while 72.3% of them indicated the opposite.

## Discussion

### The possibilities of using ICT in teaching-learning

From the review of literature, it was established that ICTs offer numerous possibilities for teachers. Research and experience have demonstrated that computers have the potential to play a powerful role in enhancing the environment of learning as well as in preparing students to acquire skills, competencies and attitudes essential for competing favourably in the emerging global 'knowledge' economy (MOEST, 2005). According to Whitehead, Boshee and Jensen (2003), computers allow the teacher to prepare learning tasks that are authentic, challenging and multidisciplinary and to use assessments that are performance-based, generative, ongoing and equitable. They also provide learning contexts that are collaborative, knowledge building and empathetic, where the teachers serve as facilitators, guides or co-learners.

In management of the curriculum, computers can benefit the teacher in the following areas. ICTs, notably computers, could assist the teacher in planning, organising, and monitoring and evaluation procedures (Kindiki, 2008); processes that rely on availability of precise and timely information. Computers can also be used in recording, storing and retrieving student data, including personal details provided in registration forms such as name, gender, address, parents' details, and course enrolled for. Computers can also be used to prepare and keep profiles of student



progress, such as attendance and records of achievement. This way, the teacher can access information at the click of a mouse regarding such issues as the details of all the courses that a school offers, the number of students in each class, and the name of the teacher teaching the course, among other details.

Curriculum management in the school is based on how teachers and educational managers allocate time as a framework upon which the structure of the whole school is built (Kindiki, 2008), and to this end computers can also be used for timetabling and daily rota. The computer also allows the teacher to prepare effectively for teaching since they can type up their schemes of work, lesson plans, lesson notes and examinations with great ease. Courses can be prepared, edited, and stored more efficiently by use of a computer. Teachers can also consult databases for schemes of work and lesson material, such as notes and flashcards.

Perhaps the greatest potential for computers in education is in the improvement of traditional teaching (Carnoy, 2004). With availability of presentation software such as PowerPoint, the teacher can prepare slides well in advance and teach with the aid of an overhead projector, thus saving a lot of time.

Other possibilities include the use of ICT to manage resources, for effective communication, assessment and evaluation, producing reports, ensuring equity and inclusion, and extending access to education. In higher education and adult training, computers can be used to open educational opportunities to individuals and groups who are constrained from attending traditional institutions (Tinio, 2008).

### **The Extent to which teachers in primary schools in Tinderet constituency use ICT in Curriculum Management**

The results indicate that lecturers in technical training institutions generally view ICT as an appropriate tool for curriculum management. This is an indicator that teachers have embraced ICT as a tool for managing curriculum. The findings show that ICT is used for handling of student information, lesson preparation, managing learning resources, student assessment, timetabling and communication.

It is telling that primary school institutions have yet to take advantage of ICT to extend access to education. Trucano (2005) has asserted that ICTs can be used to open educational opportunities to students and individuals who are constrained from attending institutions of learning.

### **Challenges of Implementing ICT in Teaching-learning Processes in Primary Schools in Tinderet Constituency**

Despite huge efforts to position information and communication technology (ICT) as a central tenet of teaching and learning in Kenya, the fact remains that many students and teachers make only limited or no formal academic use of computer technology (Kessy, Kaemba, & Gachoka, 2006). This is usually attributed to a variety of operational deficits on the part of students, teachers, and institutions (schools). Significant challenges that need to be addressed include educational policy and planning, infrastructure, language and content, capacity building, financing and monitoring and evaluation (Whitehead, Jensen and Boshee, 2003; Farrell, 2007).

The findings indicate that the greatest challenge that lecturers face is unavailability of computers. Only 19.5% of the lecturers responded that the number of ICT equipment for lecturers' use is adequate while 72.3% of them indicated the opposite. Another notable challenge was the lack of institutional commitment in requiring lecturers to use ICT coupled with the lack of procedures for monitoring and evaluating lecturers' use of ICT in curriculum management. This finding is in agreement with Farrell's (2007) contention that one challenge is the lack of a clear purpose for use of technology in teaching and learning. Similarly, Trucano (2005) has argued that during the program design process of most ICT in education initiatives, little attention is paid to monitoring and evaluation issues and feedback loops.

Whereas infrastructure has often been cited as another major obstacle to embracing ICT in educational institutions in Kenya (Tinio, 2008), the findings of this study indicate that primary school institutions are working towards overcoming this challenge as exemplified by the presence of internet connectivity. Ninety one point seven percent (91.7%) of the respondents indicated that internet connectivity is not a problem in their institution. However, there is still need to further probe into how efficient such infrastructure is, especially the speeds of connectivity.

For any ICT integration to be successful, various competencies must be developed throughout the educational system among teachers, technical support specialists, educational administrators, and content developers. In view of this, it is considered unfortunate that adequate capacity building of teachers' in ICT integration is yet to be achieved. Although half of the teachers (50%) responded in the affirmative to the question about their level of training, more still needs to be done.

Many teachers acknowledged that ICT has great potential to enhance learning activities, but that this is hampered by challenges such as inadequate equipment, lack of technical and administrative support, inappropriate attitudes and inadequate training. One wrote, "Teachers lack capacity for use of ICT in curriculum management," and another elaborated on this pointing out that "Training should focus on teaching methodologies that are ICT based." Clearly, training is still a concern. According to Tinio (2008), teacher professional development should have focus on skills with particular applications, integration into existing curricula, and curricular changes related to the use of IT. Ideally, these should be addressed in pre-service teacher training and built on and enhanced by in-service programmes.

One interesting finding is that teachers in primary school institutions have appropriate mindsets for ICT integration. While 41.7% of them indicated that lecturers are enthusiastic about ICT, responses to the other question relating to attitudes indicated that many teachers (86.1%) take advantage of internet to obtain class materials. This suggests that teachers in technical training institutions are shedding off the label 'technophobic' and are ready to embrace ICT for teaching-learning.

## **Conclusion**

ICTs offer great potential that can be exploited to enhance teaching-learning processes. Broadly speaking, lecturers in technical training institutions regard and use ICT as an appropriate tool for managing curriculum. However, the process of integrating ICT in teaching-learning in technical institutions is still riddled with challenges, notably unavailability of computers, lack of procedures for monitoring and evaluating ICT use, and inadequate capacity building. In light of this, it was recommended that primary school institutions should put in place

procedures for re-training teachers in ICT integration, management should provide adequate support, and that primary school institutions should equip their institutions with more computers to expand access to education since the use of computers will act as a motivator for learners to attend school.

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