

# E-Learning In Primary Schools: A Comparative Study Of Selected Primary Schools In Kisumu Municipality And Muhoroni Sub County, Kenya

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## Abstract

The use of computer based activities to support collaborative teaching provide children with direct teaching of speaking and listening skills which prepare them for talking. The child in primary school is supposed to get ready to expand his/her language skills since it is the medium of instruction. There has been urgent need to improve knowledge dissemination procedures so as to enhance students' undertakings. In order to achieve good results in the performance, integration of electronically motivated learning with the traditional ones is necessary. However, there have been big disparities in performance of languages in the KCPE results between schools from Kisumu Municipality and Muhoroni Sub. The purpose of the study was to compare the e-learning resources, usage and challenges in instruction and student performance among primary schools in Kisumu Municipality and Muhoroni Sub County. The study objectives were to compare the difference in e-learning resources, to determine the difference in e-learning usage, and to compare the challenges facing the use of ICT's for instruction among primary schools in Kisumu Municipality and Muhoroni Sub County. A causal comparative research design was used on a population of 104 and 50 pupils, teachers, and head teachers from Kisumu Municipality and Muhoroni Sub County, respectively, on whom three separate questionnaires were used for data collection. Purposive sampling method was used to select 10 primary schools from the two regions, where 10 pupils, two teachers and one head-teacher were randomly selected to participate in the study. Hypotheses were used to test statistical difference in resource usage, and challenges, using the t- test at alpha level of significance. Construct and content validity was done to ensure the instruments were adequate and the content required was covered respectively. The findings were that teachers and pupils in Kisumu Municipality had a higher rate of access to ICTs, although this did not contribute to performance in KCPE. Due to the above, the study recommends that appropriate infrastructure be established to support e-learning equipment.

**Keywords:** E-Learning; Resource; Usage; Challenges; Performance

## Introduction

ICT in education is significant in primary education for teaching and learning purposes. E-learning has become a widely accepted learning module in recent years (Mpherson, 2005). Although there are numerous studies that debate its appropriateness, others discuss its application and practices and investigate its influence on the facets of today's education (Chan et al., 2001). E-learning itself lacks a clear definition. Some related terms that share similar characteristics with e-learning include distributed learning, online learning, web based learning, distance learning, network learning and technology based learning (Wentling et al., 2000). After thoroughly reviewing the definitions of all these terms as proposed by prior researchers, Wentling et al. (2000) suggests that e-learning is the acquisition and use of knowledge distributed and facilitated primarily by electronic means.

The process of learning may be structured in different ways – in a classroom or at home, with or without a teacher, emphasizing or minimizing grammar, gradually exposing the student to native speakers or prompt immersion (Jurich, 2001). Learners on the one hand have more control and flexibility in their learning but on the other hand they need to take more responsibility for their own learning (Shi et al., 2007). Since the introduction of computers at Bugulumbya Primary School in Uganda pupils have been able to find information on anything they need and also improve their learning skills (Madamombe, 2007). E-learning also provides the components of effective cooperative learning and positive interdependence, individual accountability and shared responsibility for one another (King & Vockell, 1991). Teachers are able to guide the learners either individually or in groups for higher achievements. There is therefore the need for access and equitable distribution of this medium of learning. Rupert and Lyn (2004) stress the fact that the use of computer based activities to support collaborative teaching provide children with direct teaching of speaking and listening skills which prepare them for talking. The child in primary school is supposed to get ready to expand his/her language skills since it is the medium of instruction. It is through English language that all the other subjects are taught apart from Kiswahili language. There has been urgent need to improve knowledge dissemination procedures so as to enhance students' undertakings (Thomas, 1988). In order to achieve good results in the performance of, integration of electronically motivated learning with the traditional ones is necessary. This could be the reason for the disparity

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in performance of languages, as has been indicated in the KCPE results of 2011 and 2012 in Kisumu Municipality and Muhoroni Sub County as seen in the tables in the next page.

Table 1: KCPE performance in languages in Muhoroni Sub County

School	2011		2012	
	Kiswahili (%)	English (%)	Kiswahili (%)	English (%)
God-Abuoro	42.34	49.37	42.00	48.00
Kibigori Rail.	47.50	48.90	41.28	44.45
Oduwo	38.67	55.63	30.22	54.86
Tamu Central	43.39	49.50	42.89	51.06
Oneno Nam	40.58	50.76	41.15	48.52

Table 2: KCPE Performance in Kisumu Municipality

School	2011		2012	
	Kiswahili (%)	English (%)	Kiswahili (%)	English (%)
Golden Elites	74.30	76.96	70.19	79.63
Victoria	70.77	84.58	72.43	83.87
Aga Khan	71.95	84.75	63.50	84.90
Xaverian	65.82	75.89	68.67	83.44
Arina	67.57	72.05	62.90	73.86

The table above shows that the performance of languages in Kisumu Municipality is better than that of Muhoroni Sub County. This study is meant to establish whether the cause for this disparity is related to the availability of resources, use of e-learning for instruction and the challenges faced by use ICTs for instruction in these two locations.

This could be true because language, whether English or Kiswahili, is the only means of delivering instructions to students, and is so far the most important aspect of the learning process, and a child who can listen well and has learnt to articulate clearly is at an advantage when more complex skills come to be learnt. However, through the history of man's learning, there is no one method, media, approach, device or philosophy that holds the key to the process of learning, but integrated approach (which is normally availed in most ICT devices), according to Houcine (2011).

#### **Statement of the Problem**

Disparities in performance in KCPE between urban and rural primary schools in Kisumu Municipality and Muhoroni Sub County have been witnessed in national examination results over time. Primary schools in urban areas have always done better than those in the rural set ups. Most researchers have attributed this disparity to the digital divide between urban and rural parts from where individual learners reside. It's however unclear what challenges abound for ICT facilitation for instruction in the country with specific reference to primary schools in urban and rural areas in Kenya. Kisumu Municipality has registered good performance in KCPE subjects as compared to Muhoroni Sub County. The utilization of ICT has been done in most schools within the urban set-up of Kisumu Municipality than the rural set-ups of Muhoroni Sub County. There is scanty information on comparative studies carried out to assess the e-learning resources, their level of use and the challenges faced in their application for instruction between urban and rural areas in Kenya and therefore this study was set to fill this gap. This study aimed at establishing how e-learning was used for instruction in selected primary schools in Kisumu Municipality and Muhoroni Sub County.

## **LITERATURE REVIEW**

### **Empirical Literature Review**

Information communication technologies are used to help improve the quality of education and training. The new challenge for the knowledge society is the digital literacy for everyone and bridging the digital divide between the north and south and urban and rural populations in the world (Ogodo, 2007). It can help improve education and training and achieve a society of lifelong learning where schools have become part of the global academic arena. Flower (2006) notes that the adoption of e-learning at St. Paul's catholic college, Burgess Hill West Sussex led to the achievement of good results. He explains that in 2005, 85% of its year 11 pupils achieved 5 or more A-C grades, the highest ever achieved by a comprehensive school in Sussex (Flower, 2006). The educators in these schools have the role of pre-selecting the content to be learnt and absorbed by e-learners as supported by the e-learning environment (Silvia *et al.*, 2004). ICTs transcend usual barriers such as time, distance, language and censorship, and when used in convergence, can allow hitherto left out communities to participate in economic, social, educational and political spheres (Zulu, 2007). ICT influences the process of change and reduces imbalances in knowledge distribution between rich and poor, educated and uneducated, rural

and urban, and men and women (Zulu, 2007). Not only the Internet, but also other tools used individually or in convergence can help in e-learning.

In Africa, Bugulumbya primary school in Uganda became the very first institution to receive computers under the NEPAD'S e-school initiative (Madamombe, 2007). The pupils at Bugulumbya primary accepted that the facility has enabled them post good results because having the internet is like having another five teachers in the class-room (ibid). Individual African states have also gone ahead to establish task forces that work with recommendations for ICT acceleration from the task force. Convergence technologies including community radios, Internet radios, local area networks, tele-centres, information kiosks and mobile phones can help in the delivery of content to pupils via e-learning in primary schools. The interactive approach between teachers and students also makes learning by the aid of ICT easier. This is an Initiative Response and Follow up (IRF) (Rupert & Lyn, 2004). The IRF is an important instrument that can be logically used to distinguish educational conversations from other kinds. This as an academic approach is appropriate, since the teacher requires isolating educational conversations for the learners' consumption and avoiding the other kinds.

In order for the ICTs to create conceptual relevance in teaching, they should be used as a tool for teaching rather than as a teacher themselves. When used for teaching they are a powerful indicator of good software that enhances language learning (David & Jane, 1991). This view needs emphasis because some teachers who have inadequate teaching practice at primary training level may leave the computer for the pupil to use solely without guidance. It is believed that most of the pupils will turn to using the computers for academically retrogressive purposes like viewing pornographic pictures rather than learning when given the opportunity. In a deeper essence we understand that language development is a code that never ends to grow. In this respect, language learning is not only affected during language lessons, but also when the language is used across the curriculum. ICT facilities encourage this use of languages across the curriculum (ibid). The use of e-Learning resources across the curriculum stimulates the creativity of the learners, making learning more flexible besides encouraging corporation in the process (Ben Youssef, 2008). According to Ruflat and Davies (2004), there are several types of ICT which can be used for instruction delivery in schools, as shown in Table 1:

Table 1: Types and application of ICTs for Instruction in Primary Schools

Type of e-learning	Application for instruction
1.Knowledge database	<ul style="list-style-type: none"> <li>• Are websites that offer explanations and guidance for certain lessons along with step instruction for programming specific tasks.</li> <li>• Very interactive.</li> </ul>
2.Online Support	<ul style="list-style-type: none"> <li>• Is in form of forums, chat rooms, online bulletin boards, e-mail or instant messaging support.</li> <li>• Offers opportunities for more specific questions and answers as well as more immediate answers.</li> </ul>
3.Asynchronous training	<ul style="list-style-type: none"> <li>• Involves self-spaced learning. Includes access to instructions through bulletin board, online discussion groups or e-mail on topical areas.</li> <li>• Offers links to reference materials in place of live instruction.</li> </ul>
4.Synchronous training	<ul style="list-style-type: none"> <li>• Used in real time. The live instructor or teacher facilitates the teaching of topical items. Everyone logs on and can communicate directly with the instructor and each other.</li> <li>• Session lasts for a set amount of time, from single lesson to several weeks. Usually takes place via internet.</li> <li>• Websites, audio or video conferencing, VOIP or even two way-broadcast to pupils in a classroom.</li> </ul>

Source: Ruflat and Davies (2004)

The above e-learning types have made the flexibility of learning possible, and there is increased extension and stronger grasp of the subject matters taught to the learners. ICTs improve quality of teaching process by increasing learning attractiveness and therefore its effectiveness. This is enhanced by the combination of video/audio elements. The replay of recorded lessons can be used to retain sessions that may not have been clearly understood earlier by the learners.

However, ICT has met several challenges in its implementation in schools. These challenges range from policy based to economy based (IST-Africa 2005-2006). The first challenge that these efforts face is the lack of deliberate, coherent and clearly understood and supported ICTs policy and strategy by the individual governments. There is no cohesive strategy for ICTs use in education, and when ICTs are used for education they are primarily found in private and urban schools. Many initiatives to include ICTs in education have been techno-centric in nature and often have not included for teacher training or curriculum development (Colin, 2001). The assumption has left ICT utilization a marginal affair, broadly limited to the young educated urban, wealthy and male. More often than not residents of rural areas have been disadvantaged due to un-availability the ICT to be utilized for learning.

Attwell (2005) observes that most countries are faced with the challenge of developing programmes capable of flexible modes of delivery leading to under utilization of the available electronic devices for learning. Infrastructure is another challenge which IST-Africa (2005-2006) reports that inadequate buildings, facilities and insufficient electricity network and supply have significant impact on rolling out ICT based learning in schools. Similarly, inadequate Human Capital Development (HDP) and lack of a comprehensive, easily accessible evidence base to support strategic policy decision-making and program design to leverage ICTs for information society development is also a challenge (IST-Africa, 2005-2006). This could hamper reporting development on the international ICT requirements on the MDGs and progress made towards implementation of World Summit on Information Society (WSIS) plan of action. There was therefore need to compare ICT resource, usage, and challenges in language instruction in primary schools in Kisumu Municipality and Muhoroni Sub County.

### Conceptual Framework

The conceptual representation guiding this study is derived from Holmes' (1965) problem solving approach and Piaget's theory of intellectual development. This framework shows how the different variables are interrelated in the study. It provides the guidelines for the study. The figure below portrays the framework.

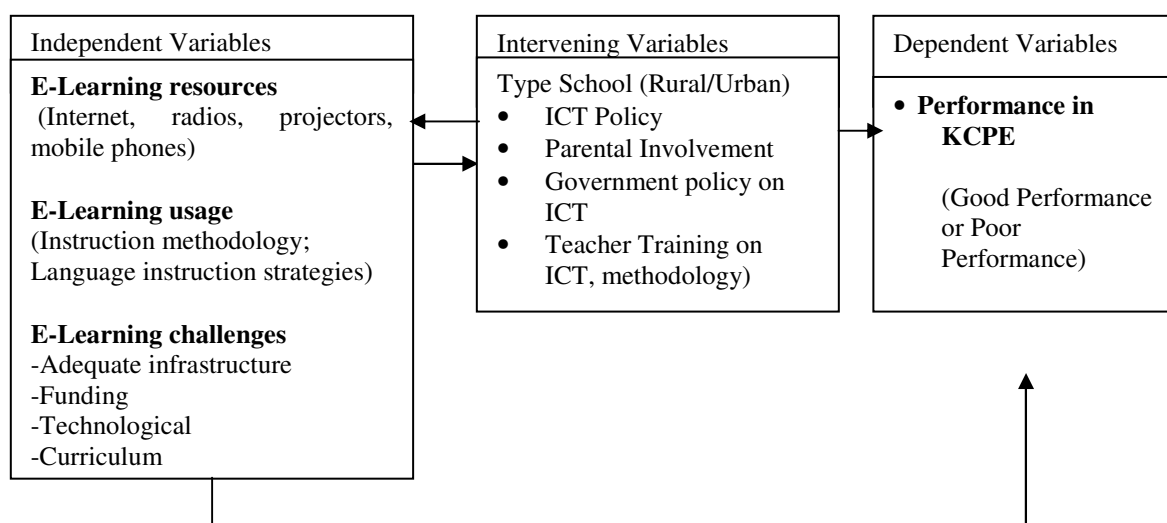


Figure 1: The link between the use of e-learning resources and performance in KCPE.

The dependent variable of the study is performance of pupils in KCPE, and is influenced by the availability and usage of e-Learning resources, which is the independent variable of the study. In the presence of and usage of e-Learning resources, performance can also be affected by ICT policy of the school, parental approach to ICT, and the level of teacher training in ICT; these are the intervening variables of the study. They have an indirect effect on both the independent and the dependent variables. The variables outlined are a key to realizing the objectives of the study stated earlier. To achieve this, the research methodology used is provided in the next chapter.

### MATERIALS AND METHODS

This study adapted the causal-comparative research design because the main purpose of this study was to determine reasons or causes of the current status of the phenomenon under study (Mugenda & Mugenda, 2003). This design was appropriate for this study because the research was designed to find out reasons why schools in Kisumu Municipality currently perform better than those schools in Muhoroni Sub County, particularly in KCPE exams. The study was a comparative analysis of the availability and use of e-learning for instructions in primary schools in Kisumu municipality and Muhoroni Sub County.

The target population included the pupils in the primary schools, the teachers and the head teachers from 104 and 50 primary schools from Kisumu Municipality and Muhoroni Sub County respectively. Among the pupils, the study focused on those in upper primary preferably from standard seven to eight, hence a total of 3900 pupils, 308 language teachers and 154 head-teachers were included in the study from both public and private schools. A sample size of 10% of the accessible population was drawn, making 10 and 5 schools from Kisumu Municipality and Muhoroni Sub County, respectively. Purposive sampling technique was used to sample the schools for the study. According to Kothari (2004), in purposive sampling the researcher's judgment is used to select those respondents who best meet the purposes of the study. The sample size therefore included 120 pupils proportionately selected, 60 teachers, and 15 head teachers, bringing a sample size of 195 participants for the study as shown in Table 2.

Table 2: Sample Size of the study

Schools	Pupils	Teachers	H/Teachers	Total
Kisumu Municipality	80	40	10	130
Muhoroni Sub County	40	20	5	65
Total	120	60	15	195

The study made use of questionnaires to collect data; questionnaires for the class seven and eight pupils helped in finding out the knowledge they have about the computer and other electronic devices and their application for learning. The questionnaire for teachers helped to assess the competency of the teachers in using the computers and other electronic devices for instruction. The questionnaire for the head-teachers solicited information on challenges faced in the technological requirement for installing e-learning equipment, the government policy on IT and parental involvement in improving performance. The shortcomings of the questionnaires were overcome by carefully enhancing their validity and reliability.

Content validation was done to determine if the content that the instrument contained adequately covers the contents they are supposed to represent. Construct related evidence was ensured from time-to-time consultations with the supervisors and other lecturers in the faculty of Education and Human Resources of Egerton University in the course of constructing and editing of the instruments. To ensure instrument reliability, two primary schools purposively sampled was used for the pre-test. A random sample of respondents was drawn from the schools to include 20 pupils, 4 teachers, and 2 head-teachers. For refinement and improvement of the research instruments, a pilot study was also conducted. Based on this, two primary schools were purposively sampled from the two locations for this purpose; one from Kisumu Municipality and the other from Muhoroni Sub County. After the pilot study, the reliability of the questionnaires was assessed using split-half technique since the instrument had an even number of items. This approach eliminated chance error due to differing test conditions as in the test, re-test technique. A reliability co-efficient of 0.70 or 70% was obtained, implying that there was high degree of reliability of the instrument. The questionnaires were dispatched to the respective respondents who had been identified, and enough time was given to the respondents to fill the questionnaires before collecting them. The researcher then visited the schools and used the observation checklist to find out the ICT equipment used.

The data collected was classified as quantitative and qualitative. Qualitative data was summarised into similarities and differences and analysed quantitatively. Coding of the row data was done to make it orderly. In analysing this data, the researcher used both the descriptive and inferential statistics of quantitative analysis.

## RESULTS, DISCUSSIONS, AND CONCLUSIONS

### E-Learning Resource for Instruction between schools from Kisumu Municipality and Muhoroni Sub County

The researcher sought to establish the availability of ICT resources in the sampled schools by listing particular devices necessary in facilitating instruction, and requested the respondents to state the level of their agreement (on a scale of 1= STRONGLY DISAGREE; to 5= STRONGLY AGREE) to confirm or deny the availability of such devices in their institutions. The results are as shown in Figure 2.

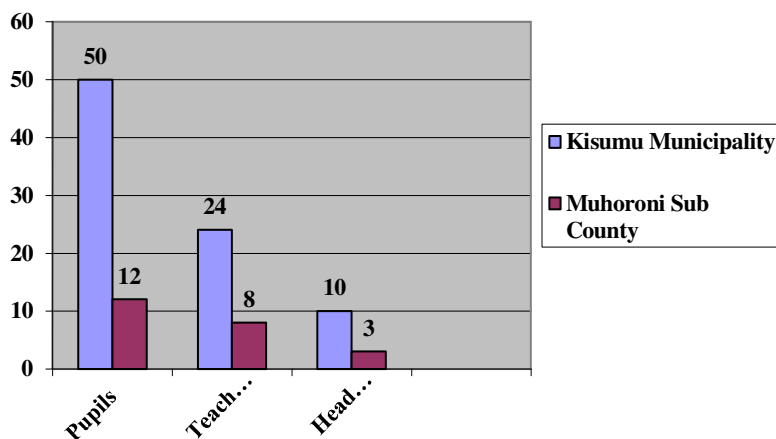


Figure 2 shows that 51.7% of the pupils indicated that ICT devices presented to them in the questionnaires were present in their schools, ( $M=4.13$ ). Of these, 80.6% were from Kisumu Municipality, while 19.4% were from Muhoroni Sub County. For the teaching staff, 53.3% of those who participated accepted that the ICT devices stated in the questionnaire were available in their schools, ( $M= 2.13$ ). These included 75% of teachers from Kisumu Municipality and 25% from Muhoroni Sub County. From the Head Teachers data, 86.7% accepted that they have ICT devices stated in the questionnaire within their institutions, ( $M= 0.87$ ); these were composed of 76.9% from Kisumu Municipality, and 23.1% from Muhoroni Sub County.

Respondents from Kisumu Municipality seem to be in possession of more e-learning resources than respondents from Muhoroni Sub County. More pupils, teachers, and head teachers from Kisumu municipality than the ones from Muhoroni Sub County indicated that they have e-learning resources which were presented. Families in urban areas normally have access to electricity services which is needed for powering ICT equipment, unlike families in rural set ups who lack adequate access to electricity services. It is not uncommon to meet such imbalance in availability of ICT resources according to areas where individual families come from. The income and social lifestyles of families also determines whether a family will possess or not possess certain types of ICT equipment. The families who come from underprivileged socio-economic environments normally possess more ICT equipment than the less privileged families (Conger *et al.*, 1997; Haveman & Wolfe, 1995). Socio economic and regional backgrounds have been established to be determining factors for e-learning availability, be it in schools or homes (Bratti, Checchi & Filippin, 2007).

The results of the analysis of central tendency were also tabulated as shown in Table 3.

Table 3: E-Learning resource in Kisumu municipality and Muhoroni Sub County schools

	N	Mean	Std Deviation	Std Error
Kisumu Municipality	10	28	18.29346	1.996
Muhoroni Sub County	5	7.67	5.821286	1.214

$\alpha = 0.05$

The table above (Table 3) indicate that schools in Kisumu Municipality ( $M=28$ ,  $SD=18.3$ ) have more e-learning resources than Muhoroni Sub County ( $M= 7.67$ ,  $SD=5.82$ ).

Further, the hypothesis below was tested for the statistical significance at 0.05 degree of confidence:

**Hypothesis One ( $H_{01}$ ): There is no statistically significant difference in e-learning resources for instruction between primary schools in Muhoroni Sub County and Kisumu Municipality**

In testing whether there is statistically significant difference in availability of e-learning resources for instruction between primary schools in Kisumu Municipality and Muhoroni Sub County, the statistical difference in e-learning resources gave a calculated  $t$  of 0.24, with  $df$  13, while the critical value for a two tailed ( $C.V_{t(13), 2tailed} = 2.16$ ). The computed  $t$  value is smaller (or insignificant) in magnitude than the critical value of 2.16 (obtained from the  $t$  table). Therefore, the null hypothesis that there is no statistically significant difference in the e-learning resources in Kisumu Municipality and Muhoroni Sub County schools is accepted. The overall performance of the schools which are found in the two regions cannot therefore be said to be influenced by the availability of ICT resources.

The difference in availability of e-learning resources is not statistically significant. This is not uncommon, given that most schools and families (for that matter) might be in possession of ICT equipment although the same equipment is not being used for instruction. Lack of technical support and knowledge may also lead one to source for an ICT gadget which is obsolete and unresponsive of e-learning (Inspectorate Evaluation Studies, 2008). The same manner in which the few ICT resources possessed by families and schools in Muhoroni Sub County is not helping them for learning is the same way it is not helping Kisumu Municipality families and schools, where ICT resources are more available. Poor choices of hardware and software may also result into a scenario where the available e-learning resources cannot be used to aid teaching either in school or at home (Newhouse, 2002).

According to the observations made by the researcher concerning availability of e-learning resources for instructions in school, it was found that most teachers and school administrators who have ICT gadgets like computers and laptops use the equipment for administrative purposes and not for lesson delivery. This may be brought about by the challenge that when instructors teach in class they must not only prepare for the class itself, but also develop contingency plans in case of technical problems. Similarly, pupils who possessed ICT equipment like mobile phones or digital cameras majorly use them (equipment) for general communication purposes, and not for academic purposes.

**The usage of ICT for instruction between schools from Kisumu Municipality and Muhoroni Sub County**

The use of ICT devices largely depended on the availability of ICT devices, besides other factors like source of power. To test how ICT devices are used by the selected primary schools under study from the two regions, statements highlighting the frequency of use of the ICT devices were presented to the respondents, by asking them to state the level of their agreement (from a scale of 1=STRONGLY DISAGREE to 5=STRONGLY AGREE) with the stated statements. The results are as stated in Figure 4.

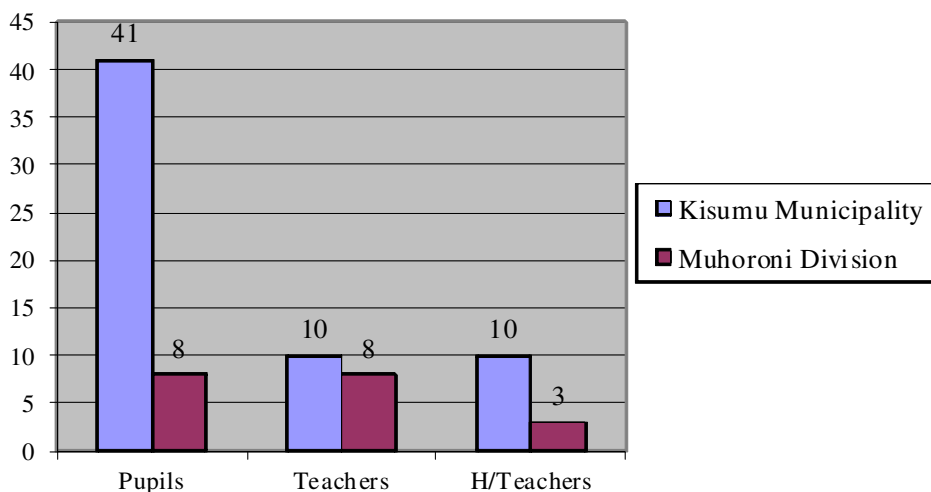


Figure 4

The results in figure 4 shows that 40.8% of the pupils frequently use the ICT devices presented to them in the questionnaire, ( $M=0.41$ ). This included 83.7% pupils from Kisumu municipality schools ( $M=0.84$ ), and 16.3% pupils from Muhoroni Sub County schools ( $M=0.16$ ). It is evident that the higher availability of e-learning resources in Kisumu Municipality has contributed to the higher frequency of use by the pupils from that area while the low frequency in availability in Muhoroni Sub County has disadvantaged the pupils there. Students do not have equal access to computing capability which creates something of digital divide among them (Paul, *et al*, 2003). Of the teachers, 40% of them sampled for this study accepted that they frequently use ICT devices in delivering instructions to their pupils ( $M=0.4$ ). Of these, 66.67% were from Kisumu Municipality ( $M=0.67$ ), and 33.3% were from Muhoroni Sub County schools ( $M=0.33$ ). For the head teachers who were sampled, 86.6% indicated that they frequently use the listed ICT devices ( $M=0.87$ ). Among them, 76.9% were from Kisumu municipality schools ( $M=0.77$ ), while 23.1% were from Muhoroni Sub County schools  $M=0.23$ .

The result of analysis of central tendency is shown in Table 4.

Table 5: E-Learning devices usage in Kisumu municipality and Muhoroni Sub County schools

Region	N	Mean	Std Deviation	Std Error
Kisumu Municipality	10	22.333	19.778	7.6748
Muhoroni Sub County	5	6.333	6.1709	0

$\alpha = 0.05$

The results in Table 5 indicate that schools in Kisumu Municipality ( $M=22.33$ ,  $SD=19.78$ ) use more ICT devices than schools from Muhoroni Sub County ( $M= 6.33$ ,  $SD=6.17$ ).

The results obtained regarding the level of use of ICT equipment for instruction in primary schools from Kisumu municipality and Muhoroni Sub County show that more respondents from Kisumu municipality use ICT equipment than respondents from Muhoroni Sub County. The lack of usage of ICT equipment for instruction can be attributed to several barriers. Lack of special technological skills (Dawes, 2001), teacher and pupil pre-preparation (Bingimlas, 2009), and lack of adequate time, confidence, and resistance to change (from traditional face to face instruction) of teachers are some of the major barriers to ICT usage in schools (Becta, 2004; Schoep, 2005). Insufficient amount of in-service training on ICT usage, and lack skills in the development of pedagogical aspects of ICT ('O'zden, 2007) and enthusiasm (Newhouse, 2002) are also contributing factors to low usage of ICT.

**Hypothesis Two ( $H_{02}$ ): There is no statistically significant difference in the use of e-learning equipment between primary schools in Muhoroni Sub County and Kisumu Municipality**

In comparing whether there is statistically significant difference in the use of e-Learning resources for instruction between primary schools in Kisumu Municipality and Muhoroni Sub County, the statistical difference in e-learning usage gave a computed  $t$  of 0.33 with  $df$  13; while the critical value ( $C.V_{t(13), 2tailed} = 2.16$ ). This computed  $t$  is smaller (or statistically insignificant) in magnitude than the critical value of 2.16 (obtained from the  $t$  table). Therefore the null hypothesis is retained, and therefore the good performance posted by schools from Kisumu municipality cannot be associated with the usage of ICT devices. Leuven, Lindahl, Oosterbeek, Webbink (2004) concluded that there is no evidence for a relationship between increased educational use of ICT and students' performance. Students may use ICT to increase their leisure time and have less time to study. Not all students even those comfortable with using a PC for e-mail, web browsing or playing games have necessary skills to fully succeed in e-learning reliant courses (Paul, *et al*, 2003).

The pupils' characteristics, denoted by age, gender, family structure, level of parents' education, geographical area, and economic status of parents is an important factor in the educational performance of pupils. Students who come from underprivileged socio-economic environments have tended to post poor school performances than the ones from privileged socio-economic backgrounds or environments (Bratti *et al.* (2007; Youssef, 2008). Similarly, teacher characteristics, like experience and teacher quality in terms of topic coverage and instruction delivery (Clotfelter *et al.*, 2004; Betts *et al.*, 2003), and the influence in the setting up of classroom climate which is conducive for learning (Rockoff, 2004), as well as interactive climate between learners themselves on one hand, and between learners and the teacher, on the other hand (Rivkin *et al.*, 2005) can also bear on pupil performance. Educational inputs can also impact on the students' performance, based on educational production functions (Glen, 2006, and Glewwee and Kremer, 2006, as cited by Youssef, 2008). The more the students benefit from the physical environment of education the better their achievement. One prominent variable in the environment and physical investment is class size. A better higher education environment is correlated with small classrooms (Arias and Walker, 2004).

#### Challenges Facing E-Learning for Instruction in Primary Schools

The challenges faced in applying ICT in instruction delivery to pupils in the two regions were identified from literature reviews carried out by the researcher, and a list of 5 issues which pose much challenge were presented to the respondents. To test the difference in challenges in the selected primary schools under study, statements highlighting some of the challenges in resources and usage of the ICT devices were presented to the respondents, by asking them to state the level of their agreement (from a scale of 1=STRONGLY DISAGREE to 5=STRONGLY AGREE) with the provided statements.

The results are as stated in Figure 6.

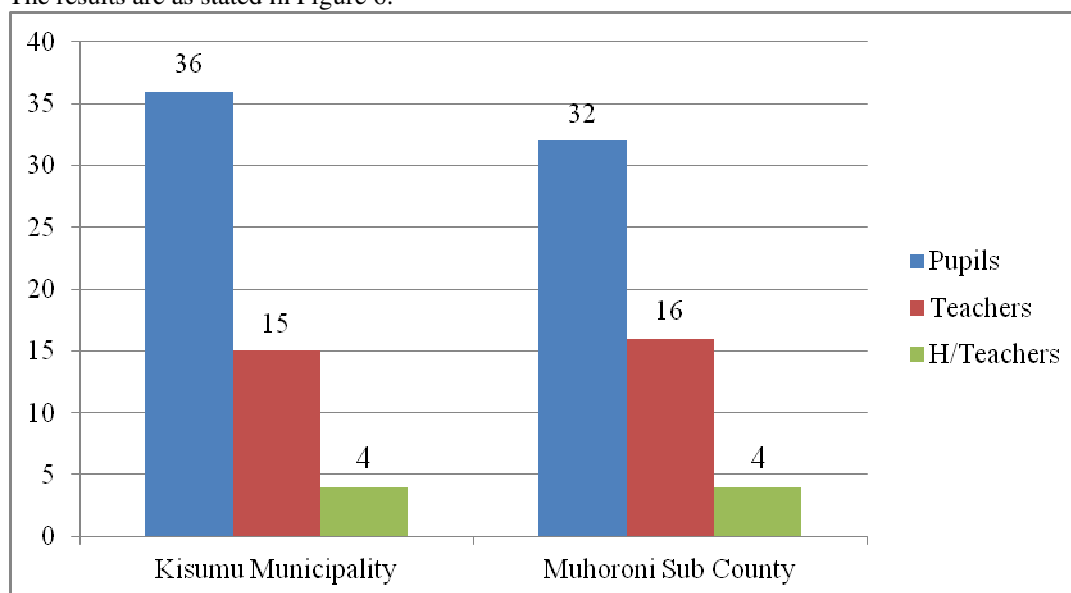


Figure 6: Challenges of ICT in primary schools

Figure 7 shows that majority (56.67%) of the pupils who were sampled agreed that they face the challenges which were listed in the questionnaire, representing a mean of 0.57 response rate. Of these, 52.9% were pupils from Kisumu Municipality, ( $M=0.53$ ). Muhoroni Sub County had 47.1% who accepted that they face the challenges as listed in the questionnaire, ( $M=0.47$ ). The teachers who agreed that the listed issues were challenge to their teaching practice using ICT devices were 51.67% of the teachers who were sampled for the study. Out of these teachers, 48.39% came from Kisumu Municipality, ( $M=0.48$ ), while the remaining 51.61% came from Muhoroni Sub County, ( $M=0.52$ ). Of the head teachers sampled for the study, majority (53.3%) agreed that the listed issues in the questionnaire were setbacks in the provision of ICT learning in the schools they head,



( $M=0.53$ ). Of these, 50% ( $M=0.5$ ) came from Kisumu Municipality and 50% came from Muhoroni Sub County ( $M=0.5$ ).

The above results point to the fact that the schools from both regions do experience almost equal magnitude of the outlined challenges, which can be seen in the congruence in perception of the head teachers. The result of analysis of central tendency is shown in Table 7.

Table 7: Challenges facing e-learning for instruction in primary schools

Region	N	Mean	Std Deviation	Std Error
Kisumu Municipality	10	18.333	16.47796	0
Muhoroni Sub County	5	17.333	14.04754	0

Source: Study data 2013

The results in Table 7 indicate that difference in schools from Kisumu Municipality ( $M=18.33$ ,  $SD=16.48$ ) and from Muhoroni Sub County ( $M=17.33$ ,  $SD=14.047$ ) in challenges in ICT resource and usage is minimal and insignificant. Further, the hypothesis that there is no statistically significant difference in the challenges faced in e-learning for instruction between primary schools in Muhoroni Sub County and Kisumu Municipality was tested using t test as follows:

**Hypothesis Three ( $H_03$ ): There is no statistically significant difference in the challenges faced in E-Learning for Instruction between Primary Schools in Muhoroni Sub County and Kisumu Municipality**

In testing whether there is statistically significant difference in challenges faced in e-learning for instruction between primary schools in Kisumu Municipality and Muhoroni Sub County, the statistical difference gave a computed t of 0.135 with  $df$  13; while the critical value ( $C.V. t_{(13) 2tailed}=2.16$ ). Therefore the null hypothesis that there is no statistically significant difference in the challenges facing e-learning for instruction by schools in Kisumu Municipality and Muhoroni Sub County was retained. This is because the calculated t (0.135) is less than the critical value obtained from the t table (2.16). The issues that are faced as far as ICT is owned and used in primary schools from both regions are more or less the same. The differences in challenges of e-learning resource or usage for instruction expressed by the respondents are statistically insignificant and cannot influence performance in KCPE examinations.

Though there are several advantages to be derived from the implementation of e-learning, these benefits are not likely to be realised due to certain fundamental challenges. E-learning requires a new instructional design. In using ICTs for instruction, the teacher plays a new different role which he/she might not be ready for. While devising a course, teachers become designers of experiences, processes and contexts for the learning activity. Besides identifying the contents, they also have to focus on motivations and active learning processes (Cantoni et al, 2004). Anderson and Gronlund (2009) argue that the appropriateness of pedagogical models favour a move from instructor-centred approach to a learner-centred approach where students take ownership of the learning. In education curricula and instruction must be reviewed in the light of the demand of information and communication technologies (Karim and Hashim, 2004).

**Conclusions**

Most pupils, teachers, and head teachers are aware and have owned various ICT devices. The children in schools under study (in their first stage from birth to 2 years) were found to encounter ICT facilities for learning and their sensitivity helped them build up concepts through their interaction with the ICT devices. The main e-learning devices that are available at home and in schools are desk top computers, digital cameras, radios, laptops, and mobile phones, and are found more in Kisumu Municipality than in Muhoroni Sub County, although these differences hardly contribute to difference in performance. Similarly, pupils start owning and listening to radios, etc mostly at the age of 7 to 11 years (the concrete operational stage), although the general usage of these devices are low in the two regions. Despite the frequency of ICT usage being more in Kisumu Municipality than in Muhoroni Sub County, this does not contribute to the difference in performance by pupils from schools in the two regions. Socio-economic background of pupils' parents, the location of the school (urban or rural), the school infrastructure and personal characteristics of both the teacher and the pupil normally affect ownership of ICT resource and usage, and this problem needs to be solved through the use of appropriate strategies. The problems of ICT resource and usage are felt more in Kisumu Municipality than in Muhoroni Sub County, although this difference problem is insignificant and cannot be attributed to the difference in performance by pupils or teachers from schools in the two regions.

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