

## **INFRASTRUCTURAL SUPPORT AVAILABLE FOR ICT INTEGRATION IN CURRICULUM PRACTICES AT LOWER PRIMARY SCHOOL CLASSES IN BUNGOMA COUNTY, KENYA.**

**By**

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### **ABSTRACT**

This study sought to examine the ICT infrastructural support available and its influence on instruction in lower primary school classes. This study was based on the Rogers (2003) Theory of diffusion of innovations. The population of the study was drawn from public primary school teachers and Sub-County Quality, Assessment and Standards Officers (SCQASOs) in Bungoma County. Descriptive survey design involving stratified and simple random sampling techniques were used. A sample of 343; comprising of 40 head teachers, 300 teachers and 3 SCQASOs from population of 968 was used in the study. Data was collected using questionnaires, interviews and observation schedules. The instruments were validated by the help of research specialists in Curriculum and Instructional Technology and using the test-re-test method, reliability of the tools was established using the Pearson's Product Moment Correlation with the r- values of 0.867 and 0.829 for teachers and head teachers' questionnaires respectively. Data collected was analyzed using descriptive statistics involving computation of frequencies and percentages. The findings from the study show that most schools generally lack the necessary infrastructure for ICT classroom curriculum integration. The study provides a basis upon which recommendations on appropriate remedies can be formulated to provide possibilities to advance and reform classroom instructional practices by the use of ICTs. The results are envisaged to contribute to enhancing the equipping of public primary schools with the necessary ICT infrastructure for this 21<sup>st</sup> century and beyond.

*(Key Words ICT Infrastructure, Instruction, Classroom Practice)*

## 1.0 Introduction

Global investments in information and communication technology (ICT) to improve teaching and learning in schools have been initiated by most governments (Andoh, 2012). Advances made in developed countries such as the United States and China have initiated multimedia and computer network where now students have adequate access to ICTs and most schools have access to internet (National Centre for Educational Statistics, 2006; Song, Liang, Liu & Walls, 2005). In Africa, most governments and nongovernmental organizations (NGOs) are emphasizing on gradual introduction of computers into pedagogy of school curriculum (Mwei, Wando & Too, 2012). Through the initiative of the new partnership in African countries for development (NEPAD) in partnership with NEPAD e-Africa Commission, there has been progress in equipping of schools with computer equipments and training teachers and pupils to use computers among African countries such as Kenya, Lesotho, Mauritius, Cameroon, Senegal, Mozambique and Rwanda (Nepad e-Africa Commission, 2004). The Kenyan government has placed considerable emphasis on the importance of information and communication technology (ICT) in its education sector support programmes as evidenced in the promulgation of the national ICT strategy for education and training (Farrell, 2007). The Sessional paper no 14 of 2012 captures information and communication technology under chapter seven and emphasizes its role as a major vehicle for teaching and learning from the earliest years where learners begin to acquire digital skills which they increasingly use to explore and exploit the world of information and to craft that into knowledge (Republic of Kenya, 2012).. The government of Kenya appreciates and recognizes that an ICT literate workforce is the foundation on which Kenya can acquire the status of a knowledgeable economy by 2030 (Republic of Kenya, 2012).

The successful introduction and use of ICT in education and training institutions is seen to play a major role in disseminating skills to the wider society and this creates positive impact on the economy (Kipsoi, Chang'ach & Sang, 2012). In 2013, the government through the ministry of education supplied computers to 2,000 secondary schools to enable them adopts ICT in teaching and learning (The STAR, 22, April 2013). The government has further shown its commitment of ensuring that one of its manifestos' promises to provide primary public school children with free laptops is realized. This implies that the government of Kenya appreciates the role of ICT in education. In the current highly competitive knowledge-based economy of the 21st century, education is the most vital strategy for socio-economic development across the world (Aikman & Unterhalter, 2005). For individuals and states it is key to creating, applying, and spreading knowledge and thus to the development of dynamic, globally competitive economies (World Bank report, 2011). It also helps the individual to realize their highest potential by preparing them for the future challenges in life (Sharma, 2012). Kenya's economy like other countries' economies requires a steady supply of scientifically and technologically knowledgeable human resource (Mutahi, 2009). This underscores the immense role science and technology play in the development of a country. Simiyu, Mutsotso and Masibo (2019) in their study on the Influence of Technical Support on ICT Integration in Classroom Practices in public primary schools in Bungoma County asserted that ICT Integration involves several ICT and other instructional materials for effective curriculum implementation. Hence, pupils should be well-equipped with the necessary knowledge and skills in science and technology to perform well in the modern economy. However, most schools lacked the necessary ICT tools. It was and still remains a big

barrier to ICT integration and even the actualization of the Competent Based Curriculum at lower public primary schools not only in Bungoma but also in other Counties in Kenya. By the time of their study ICT Integration was either little or none-existent in most schools.

The introduction of ICT in education is part of the more fundamental objective to improve education globally and to make it accessible to everyone. The use of ICT in education has the potential to enhance the quality of teaching and learning, the research productivity of teachers and students, and the management and effectiveness of institutions (Kashorda et al. 2007). The importance of pedagogical integration of ICT in Kenya and globally cannot be overemphasized. It is becoming increasingly apparent that all aspects of people's lives including the way education is taught and delivered are greatly influenced by developments in Information and Communication Technologies (ICTs). The ICT policy gives an opportunity for establishment of grassroot based infrastructure for knowledge sharing (Mureithi and Munyua 2006). An examination of the National ICT Policy (2006) and The National ICT Strategy for Education and Training revealed that they recognize the role of ICTs in education and development. ICT as a universal tool in education and training, and its integration to improve access, learning and administration are emphasized. These policies seek to establish policy frameworks; install digital equipment, connectivity and network infrastructure; and integrate ICTs in education and training. Kenya Education Sector Support Programme (KESSP) (2005-2010), focuses on challenges facing the education sector and gives solutions on how to overcome them. Despite the mandate that accompanies this policy document that information communication technology be integrated in the range of courses in the key learning areas, there is evidence to suggest that computers are not widely integrated into classrooms in Kenya just like in other countries (D'Souza, Sabita and Wood, 2003).

Research has shown that despite reports on teachers' increasing knowledge of and familiarity with technology and there being infrastructure to support it, many teachers still may not be effectively integrating technology into their teaching and hence need for effective professional development for teachers (Wanjala, et al, 2010, 2011). The slow pace of integration of ICT in instruction is disturbing given the benefits that are attributed to integrating technology into the classroom instruction in this 21<sup>st</sup> Century (Mureithi et al, 2006). Creating secure, safe, child friendly and challenging environments that promote interactions and learning is fundamental for achieving and maintaining quality instruction (IJEDICT, 2016). Researchers advocate for learner-centered instructional strategies to enhance on quality learning (McGregor& Mrmane, 2010) and therefore need for a paradigm shift to ICT Integration. With the great advancements in technology in both developed and developing countries, there has been a change in the way people learn, communicate and do business. Indeed, according to this study, Science, Technology and Innovation (ST&I) have the ability to create, distribute and exploit knowledge for achieving the Kenya Vision 2030. Previous empirical studies world over have highlighted the roles of computer as an instructional tool in the classroom particularly in enriching the teaching and learning of Mathematics (Mubichakani, 2012; Wanjala, 2005). However, it is surprising that most schools especially in developing nations and Kenya in particular are yet to integrate its use in the teaching and learning. Despite investments of most governments and non-governmental development partners such as NEPAD in stocking schools with ICT resources, ICT integration in instruction is still slow and difficult owing to existence of enabling and disabling factors. It is on

this basis that the study reported in this paper sought to examine the influence of infrastructure available on integration of information communication technology in instruction.

## **2.0 Purpose and Objective of the Study**

The study sought to examine the influence of ICT infrastructural support on classroom practices at primary school classes in Bungoma County, Kenya. Specifically, the study sought to determine the influence of the infrastructural support available on ICT integration in classroom practices in public primary schools.

## **2.1 Research Question**

What is the influence of infrastructural support on ICT integration in classroom practices in public primary schools?

## **3.0 Methodology**

This study adopted the descriptive survey research design involving both quantitative and qualitative data collection. Creswell (2007) suggests that descriptive studies were advantageous when not much has been written about the topic or the population being studied. It was preferred over other designs because of its rapid data collection and ability to help understand populations from a part of it (Orodho, 2002). This study was undertaken in public primary schools in Bungoma County. The study targeted teachers and head teachers drawn from public primary schools, and Sub-County Quality Assurance and Standards Officers (SCQASOs) in the 9 Sub-Counties including Mt. Elgon, Cheptais, Kimilili, Bungoma North, Bungoma West, Bungoma Central, Bungoma South, Bungoma East and Bumula of Bungoma County. The pilot study was undertaken in 2 schools which did not participate in the actual study and the results were used in establishing the validity and reliability of the research tool. The tools were validated in terms of content and construct by a panel of experts in curriculum instruction and technology (Polit & Beck, 2010). The stability test was carried out using the test-retest method during a pilot study and reliability of the instruments determined by correlating the two administrations using Pearson's product-moment correlation coefficient (Kothari, 2009). The values obtained were 0.867 and 0.829 for teachers and head teachers' questionnaires respectively. These were above the recommended threshold of 0.7 hence the instruments were considered ideal, reliable and suitable for collection of data (Frankel, Wallen and Hyun, 2000). Data analysis entailed descriptive statistics using frequencies and percentages from which interpretations and recommendations were made. In addition, the quantitative analyses were supplemented by qualitative descriptions to provide a fuller picture of the findings.

#### 4.0 Results

The study sought to assess the influence of ICT infrastructure available for integration in curriculum practices. The study involved 340 teachers and head teachers who were drawn from public primary schools in Bungoma County. These included 40 head teachers and 300 teachers from primary schools and 3 SQUASOS in the sampled sub-counties in Bungoma County. Further, the study also involved 3 Sub County Quality, Assurance and Standards Officers (SCQASOs) in the sampled Sub Counties (Bungoma West, Bungoma Central and Cheptais. The study sought to establish the existence of the school vision and policy issues as relates to the integration of ICTs in instruction. The head teachers were asked to respond on the issues related to the ICT vision and policy. The results are as indicated in Table 1.

**Table 1: Head Teachers' Perceptions on the Schools' Vision Policy Issues on ICT Infrastructural Support**

	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	F	%	f	%	f	%	F	%	f	%
My school has a clear formulated policy of ICT integration	0	0	9	23	3	7	10	25	18	45
My school vision on ICT is well known to my colleagues	0	0	9	23	0	0	16	40	15	37
My school has a well formulated ICT policy plan	0	0	3	7	4	10	8	20	25	63
The ICT plan has a shared vision	0	0	7	18	9	23	7	18	17	41
The ICT plan in my school gives assistance on how to use ICT	1	3	2	5	2	5	16	40	19	47
ICT policy plan is regularly monitored and adjusted	0	0	2	5	0	0	18	45	20	50

The study sought to know whether the schools had a clear formulated policy of ICT integration, 9 (23%) of the head teachers who participated in the study agreed, 3(7%) were undecided as a majority 10 (25%) and 18 (45%) disagreed. On whether the school vision on ICT is well known to their colleagues, 9 (23%) of the head teachers who participated in the study agreed as 16 (40%) and 15 (37%) disagreed. Asked whether the school had a well formulated ICT policy plan, 3 (7%) of the head teachers who participated in the study agreed, 4 (10%) were undecided as a majority 8 (20%) and 25 (63%) disagreed. It was established that ICT plan had a shared vision as indicated by only 7 (18%) of the head teachers who agreed though most of the head teachers disagreed as indicated by 9 (23%) who were undecided, 7 (18%) and 17 (41%) who disagreed.

On whether the ICT plan in school gives assistance on how to use ICT, 1 (3%) and 2 (5%) agreed, 2 (5%) were undecided as a majority 16 (40%) and 19 (47%) of the head teachers disagreed. However, on whether the ICT policy plan is regularly monitored and adjusted only 2 (5%) of the head teachers agreed as a majority 18 (45%) and 20 (50%) of the head teachers disagreed. The findings agree with what the National Centre for Education Statistics (2006) in the Internet Access in the U.S public schools and classrooms established. The study recommended that the ICT use in curriculum implementation requires good supportive education policies. There should be good policies, school planning and monitoring to realize effective integration of ICTs in classroom instructional practices.

The study sought the views of teachers on the role and influence of ICT infrastructural support on ICT applications in classroom practices. The results are shown in Table 2.

**Table 2: Teachers' Views on Infrastructural Support for ICT Integration**

	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	f	%	f	%	f	%	f	%	f	%
ICTs encourage individualized instruction	72	24	84	28	9	3	81	27	54	18
ICTs make teaching easy and efficient	36	12	81	27	9	3	129	43	45	15
Working with ICTs will not be important and efficient	18	6	111	37	27	9	90	30	54	18
ICTs enhance development of problem-solving skills	45	15	90	30	9	3	93	31	63	21
Knowing how to work with ICTs will improve my work/teaching	36	12	81	27	18	6	120	40	45	15
Learning how to use the ICTs materials is Worthwhile	45	15	81	27	18	6	111	37	45	15
I can't think of any way I will use ICTs in my teaching	27	9	111	37	27	9	72	24	63	21
Anything ICTs can be used for; I can do just as well some other way	0	0	111	37	36	12	54	18	99	33

The study sought response to whether ICTs encourage individualized instruction, 72 (24%) and 84 (28%) agreed, 9 (3%) were undecided as 81 (27%) and 54 (18%) of the teachers disagreed. The results show that most of the teachers 156 (52%) most of the teachers acknowledge that ICTs encourage individualized instruction. On whether ICTs make teaching easy and efficient, 36 (12%) and 81 (27%) of the teachers agreed, 9(3%) were undecided as 129 (43%) and 45 (15%) of the teachers disagreed. The results show that 174 (58%) most of the teachers could not acknowledge that ICTs make teaching easy and efficient which could be attributed to their not interacting with ICTs during and after training. Working with ICTs will not be important and efficient as noted by 18 (6%) and 111 (37%) of the teachers, 27(9%) were undecided as 90 (30%) and 54 (18%) most of the teachers disagreed.

On whether ICTs enhance development of problem-solving skills, 45 (15%) and 90 (30%) of the teachers agreed, 9 (3%) were undecided as 93 (31%) and 63 (21%) most of the teachers disagreed. Knowing how to work with ICTs will improve my work/teaching as indicated by 36 (12%) and 81 (27%) of the teachers agreed, 18 (6%) were undecided as 120 (40%) and 45 (15%) most of the teachers disagreed. On whether learning how to use the ICTs materials is worthwhile, 45 (15%) and 81 (27%) of the teachers agreed, 18 (6%) were undecided as 111(37%) and 45 (15%) most of the teachers disagreed. On whether they cannot think of any way they will use ICTs in teaching, 27 (9%) and 111 (37%) most of the teachers agreed, 27 (9%) were undecided as 72 (24%) and 63 (21%) of the teachers disagreed.

On whether anything ICTs can be used for, they can do just as well some other way, 111 (37%) of the teachers agreed, 36 (12%) were undecided as 54 (18%) and 99 (33%) most of the teachers disagreed. The results show that most teachers agree that ICTs encourage individualized instruction and that working with ICTs will be important and efficient. However, most of the teachers could not acknowledge that ICTs enhance development of problem-solving skills, knowing how to work with ICTs will improve my work/teaching. ICTs make teaching easy and efficient and therefore ICT are worthwhile. These findings are in agreement with what Afshari (2009) found out in his study on the factors affecting teachers' use of ICTs in Malaysia that there is need for the government to give priority to provide teachers with access to ICTs through proper teacher training, quality digital content and other necessary infrastructural ICTs materials for curriculum implementation.

The study sought to find out the head teachers' perceptions on the role and influence of ICT infrastructure on ICT integration in classroom practices. The findings are shown in table 3.

**Table 3: Head Teachers' Perceptions on Infrastructural Support Available for ICT Integration in Classroom Practices**

	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	f	%	f	%	f	%	f	%	f	%
ICTs encourage individualized instruction	12	30	1	25	8	20	4	10	6	15
ICTs make teaching easy and efficient	15	37	2	5	3	7	13	33	7	18
Working with ICTs will not be important and efficient	2	5	8	20	5	12	12	30	13	33
ICTs enhance development of problem-solving skills	10	25	1	30	1	3	6	15	11	27
Knowing how to work with ICTs will improve my work/teaching	15	37	5	13	2	5	11	27	7	18
Learning how to use the ICTs materials is worthwhile	11	27	9	22	5	13	7	18	8	20
I can't think of any way i will use ICTs in my teaching	2	5	6	15	4	10	10	25	18	45
Anything ICTs can be used for, I can do just as well some other way	2	5	6	15	1	3	19	47	12	30

The study sought the response of the head teachers on whether ICTs encourage individualized instruction, 12 (30%) and 10 (25%) agreed, 8 (20%) were undecided as 4 (10%) and 6 (15%) of the head teachers disagreed. The results show that most of the teachers acknowledge that ICTs encourage individualized instruction. On whether ICTs make teaching easy and efficient, 15 (37%) and 2 (5%) of the head teachers agreed, 7 (7%) were undecided as 13 (33%) and 7 (18%) of the head teachers disagreed. Working with ICTs will not be important and efficient as noted by 2 (5%) and 8 (20%) of the head teachers, 5 (12%) were undecided as a 12 (30%) and 13 (33%) most of the head teachers disagreed. On whether ICTs enhance development of problem-solving skills, 10 (25%) and 12 (30%) most of the head teachers agreed, 1 (3%) were undecided as 6 (15%) and 11 (27%) of the head teachers disagreed.

On whether knowing how to work with ICTs will improve my work/teaching as indicated by 15 (37%) and 5 (13%) most of the head teachers agreed, 2 (5%) were undecided as 11(27%) and 7 (18%) of the head teachers disagreed. On whether learning how to use the ICTs materials is worthwhile, 11 (27%) and 9 (22%) of the head teachers agreed, 5 (13%) were undecided as 7(18%) and 8(20%) of the head teachers disagreed. On whether they cannot think of any way they will use ICTs in teaching, only 2 (5%) and 6 (15%) of the head teachers agreed, 4 (10%) were undecided as 10 (25%) and 18 (45%) of the head teachers disagreed. On whether anything



ICTs can be used for, they can do just as well some other way, 2 (5%) and 6 (15%) only of the head teachers agreed, 1 (3%) were undecided as 19 (47%) and 12 (30%) most of the head teachers disagreed. The results show that most teachers agree that ICTs encourage individualized instruction and make teaching easy and efficient, ICTs enhance development of problem solving skills and working with ICTs will be important and efficient. Knowing how to work with ICTs will improve their work/teaching and that learning how to use the ICTs materials is worthwhile.

The study sought response from the head teachers on the influence of infrastructural support available for ICT integration in classroom practices. The findings are as shown in table 4.

**Table 4: Head teachers' perception on Infrastructural Support Available for ICT Integration**

Head Teachers Views	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	F	%	f	%	f	%	f	%	f	%
Assist students in accessing digital information efficiently and effectively	17	43	7	18	5	12	5	12	6	15
Support student-centered and self-directed learning	11	27	7	18	2	5	13	32	7	18
Produce a creative learning environment	14	35	6	15	4	10	9	22	7	18
Promote collaborative learning in a distance-learning environment	15	37	10	25	0	0	7	18	8	20
Support teaching by facilitating access to course content	13	33	4	10	6	15	11	27	6	15
Offer more opportunities to develop critical thinking skills	13	32	2	5	4	10	14	35	7	18
Improve teaching and learning quality	16	40	3	7	2	5	7	18	12	20

The results show that 17 (43%) and 7 (18%) of the head teachers who participated in the study agree that ICTs assist students in accessing digital information efficiently and effectively. On whether ICTs support student-centered and self-directed learning, 11 (27%) and 7 (18%) of the head teachers agreed, 2 (5%) were undecided as 13 (32%) and 7 (18%) most of the head teachers disagreed. On whether the use of ICTs produce a creative learning environment, 14 (35%) and 6 (15%) agreed, 4 (10%) were undecided as 9 (22%) and 7 (18%) most of the head teachers disagreed.

On whether ICTs promote collaborative learning in a distance-learning environment, 15 (37%) and 10 (25%) most of the head teachers agreed as 7 (18%) and 8 (20%) of the head teachers disagreed. On whether ICTs support teaching by facilitating access to course content, 13 (33%)

and 4 (10%) most of the head teachers agreed, 6 (15%) were undecided as 11 (27%) and 6 (15%) of the head teachers disagreed. On whether the use of ICTs Offer more opportunities to develop critical thinking skills, 13 (32%) and 2 (5%) agreed, 4 (10%) were undecided as 14 (35%) and 7 (18%) most of the head teachers disagreed. On whether ICTs improve teaching and learning quality, 16 (40%) and 3 (7%) most of the head teachers agreed 2 (5%) were undecided as 7 (18%) and 12 (20%) most of the head teachers disagreed. The results show that most of the head teachers acknowledge that ICTs assist students in accessing digital information efficiently and effectively and promote collaborative learning in a distance-learning environment. ICTs support teaching by facilitating access to course content, and that ICTs improve teaching and learning quality. However, most of the head teachers had negative perceptions on the role of ICTs on supporting student-centered and self-directed learning, producing a creative learning environment and offering more opportunities to develop critical thinking skills. These findings are in agreement with findings of Mubichakani (2017) that ICT integration motivates learners and raises their level of achievement.

The teachers were also asked to respond on the availability of ICT infrastructure including electricity, internet, computers, E-materials, television, projectors, data base applications, presentation applications, computer/ICT laboratories/rooms, technical experts and content software. The availability of the ICT infrastructure was rated highly adequate, adequate, inadequate, highly inadequate and not available. The findings are as indicated in Table 5.

**Table 5: Teachers' Views on Infrastructural Support Available for ICT integration**

Teachers, Data Availability of	Highly Adequate		Adequate		Inadequate		Highly Inadequate		Not Available	
	F	%	f	%	F	%	f	%	f	%
Electricity	9	3	90	30	111	37	0	0	90	30
Internet	0	0	63	21	129	43	0	0	108	36
Computers	0	0	9	3	45	15	18	6	228	76
E-materials	0	0	0	0	36	12	36	12	228	76
Television	0	0	9	3	54	18	18	6	219	73
Projectors	0	0	0	0	27	9	27	9	246	82
Data base	0	0	0	0	27	9	27	9	246	82
Presentation applications	0	0	0	0	18	6	36	12	246	82
Computer/ICT laboratories	0	0	0	0	45	15	0	0	255	85
Technical experts	0	0	0	0	18	6	27	9	255	85
Content software	0	0	9	3	18	6	18	6	255	85

The results showed that on availability of electricity in the schools, highly adequate was noted by 9 (3%), adequate by 90 (30%), inadequate by 111 (37%), highly inadequate by none as 90 (30%) of the teachers indicated that electricity is not available. On the availability of internet, adequate was noted by 63 (21%), inadequate by 129 (43%) as a majority 108 (36%) of the teachers indicated that the internet is not available. The use of availability of computers was not rated

highly adequate but adequate by 9 (3%), inadequate by 45 (15%), highly inadequate by 18 (6%) as a majority 228 (76%) of the teachers indicated that the computers are not available.

The use of E-materials was not rated highly adequate or adequate but inadequate by 36 (12%), highly inadequate by 36 (12%) as 228 (76%), most of the teachers indicated that they are not available. The availability of television was not rated highly adequate but adequate by 9 (3%), inadequate by 54 (18%), highly inadequate by 18 (6%) as a majority 219 (73%) of the teachers indicated that the television is not available. The availability of projectors was not rated highly adequate or adequate but inadequate by 27 (9%) and highly inadequate by 27 (9%) as a majority 246 (82%) of the teachers indicated that the projectors are not available. The availability of Database was not rated highly adequate and adequate but inadequate by 27 (9%), highly inadequate by 27 (9%) as a majority 246 (82%) of the teachers indicated that the computers are not available.

The availability of Power Point presentation applications was not rated highly adequate and adequate but inadequate by 18 (6%), highly inadequate by 36 (12%) as a majority 246 (82%) of the teachers indicated that the Power Point presentations applications are not available. The availability of computer/ICT laboratories was rated inadequate by only 45 (15%) of the teachers who participated in the study as a majority 255 (85%) of the teachers indicated that such laboratories or rooms are not available. The availability of technical experts was not rated highly adequate and adequate but inadequate by 18 (6%), highly inadequate by 27 (9%) as a majority 255 (85%) of the teachers indicated that the technical experts are not available. Availability of content software was not rated highly adequate but adequate by 9 (3%), inadequate by 18 (6%), highly inadequate by 18 (6%) as a majority 255 (85%) of the teachers indicated that the content software materials are not available.

#### **4.1 Discussion of Findings**

The study sought to ascertain the type of infrastructure support needed for the integration of ICTS in curriculum practices in primary schools. The availability of the ICT infrastructure was rated highly inadequate and not available in most cases. The teachers acknowledged that there was inadequate ICT infrastructure including electricity, internet, computers, E-materials, television, projectors, data base applications, presentation applications, computer/ICT laboratories/rooms, technical experts and content software. The results show that in most of the schools, the head teachers acknowledged that they do not encourage and support teachers to attend in-service ICT training. That computers in their schools are not frequently serviced to ensure they are in good condition. That good software programs and skills/knowledge of using computer for instruction are lacking. The results show that in most schools as reported by the head teachers and teachers who participated in the study, the necessary ICT infrastructure including computer labs, computer hardware and software, projectors amongst other ICT tools were lacking or inadequate. This was noted as a factor that led to minimal or no use in most of the schools that participated in the study. The results show that in most schools most of the teachers indicated that ICT infrastructural materials are not available. However, in the schools with these ICT infrastructural materials, they were inadequate or highly inadequate. This agrees with what Wanjala (2010) found out that like in other developing countries ICT infrastructure in Kenya is dependent on the availability of infrastructure such as computers, printers, scanners and

projectors, which are rarely available in our Kenyan public primary schools. The findings are in agreement with other studies which point out that the need for adequate infrastructure for ICT integration be realized in schools (Erb, 2008; RoK, 2010; Yildirim, S., 2007 & Yilmaz, N. P., 2011). There is thus need for provision of adequate ICT infrastructure in schools which include ICT integration pedagogical tools such as digital cameras, video recorders, computers, audio tape recorders, DVD, laptop computers, recorders, fax machines, printers, mobile phones, internet, power point and email, virtual teaching, environment inclusive of both hardware and software, overhead projectors, photocopiers and interactive whiteboards.

#### **4.2 Implications**

The study reported in this paper highlights the need to recognize that ongoing action would be required to meet the challenges ahead. There is thus need for the Government to give priority to providing teachers with access to ICT through professional development, quality digital content and ICT infrastructure. There is need for the government to support school initiatives by providing policies and protocols that facilitate the uptake and use of ICT in schools. Priority should be given for securing further investment to ensure that there is a recurrent funding for ICT and a critical mass of quality digital content is available to schools. These could even further enhance the Competence Based Curriculum on going at lower primary schools in Kenya. The government is further set to providing all schools with access to affordable telecommunications bandwidth of sufficient capacity, reliable infrastructure and technical support.

#### **5.0 Conclusion**

This study attempted to explore the influence of infrastructure support on the use of ICT tools in instruction in primary school classes. The potential of Information Communication Technology can only be realized if educators at all levels understand the issues facing them, define the role of information communication technologies in education, and plan for its appropriate use by classroom teachers. Teachers realize the tremendous potential ICTs can bring to teaching and learning. The challenges facing teachers in their initiative to use ICTs are vast and complicated and affect them on a personal and professional level. From the findings of the study, it can be concluded that the teacher, not the technology, is of central importance to the implementation of ICTs in curriculum practices in primary schools. Staff development should have a curricular focus and help teachers to integrate (ICTs) technology into the curriculum. This implies changes to the current professional development strategies. From this study if authentic integration of ICTs is to occur, professional development strategies must focus on giving teachers an understanding on how educational curriculum objectives can be supported by technology and how ICTs will influence their pedagogy. The findings, discussions and implications of this study are important to the implementation of ICTs technology in an educational context. It is hoped that this study has stimulated the thinking about the importance infrastructural development if any meaningful integration of the information communication technology into teaching and learning is to be achieved.

## 6.0 Recommendations

Based on the research findings and the implications of the same there is need for providing policies and protocols that facilitate the uptake and use of ICTs in curriculum practices in primary schools. There is need for the Government to give priority to providing teachers with access to ICT resources through quality digital content and computer infrastructure. The researcher recommends that the ministry of education should embark on a serious campaign through its various arms, to enable teachers understand and appreciate that the teaching in primary schools would be greatly enhanced in the event they use ICTs. Any teacher with the desire to improve pupils' attitudes, motivation and achievement should be sensitized and encouraged on the use of ICTs in instruction.

## 7.0 References

- Andoh:A.C (2017). Factors Influencing teachers' adoption and integration of ICT :A Review of Literature.*International Journal of Education and Development using ICT (IJEDICT)* ,8, 136 -155.
- Borg, W. and Gall, J. (2007). Educational Research: An Introduction. Retrieved January, 13 2012, from <http://www.amazon.com/EducationalResearch-Introduction-M-all/dp/0205488498>
- Creswell, J.W., and Plano Clark, V. (2007). *Designing and conducting mixed methods research*. Thousand Oaks: SAGE.
- Farrell, G. (2007). *Survey of ICT in Education in Kenya*. Washington, DC: info Dev/World Bank.
- Gakuu C.M. and Kidombo, H.J. (2010) Pedagogical Integration of ICT in Selected Kenyan Secondary Schools: Application of Bennett's Hierarchy, *Journal of Continuing, Open and Distance Education, University of Nairobi*.
- Government of Kenya (2006). The National Information Communication Policy, Nairobi, Government Printer.
- KICD (2013). *Integrating of ICT in Primary Trainers manual*, Nairobi: KICD.
- Kipsoi,E.J (2017). Challenges facing adoption of ICT in educational management in schools in Kenya.*Journal of sociological research*.
- Kombo, D.K, Tromp, D.L. (2006). *Proposal and Thesis Writing: An Introduction*. Nairobi Paulines Publications.
- Kothari, C.R (2009). *Research Methodology: Methods and Techniques*. New Delhi. Vishwa.
- Mubichakani J. M. (2017). *Effect of Computer Based Learning in Mathematics on Learner's Motivation and Achievement Level in relation to Gender in Bungoma North District*. Kenya unpublished Mphil Thesis, Moi university.

- Mureithi, M. and Munyua, W.A. (2006). Making ICT work for the poor in Kenya: *In search of an entry strategy framework, Working draft Version 4* [mureithi@summitstrategies.co.ke](mailto:mureithi@summitstrategies.co.ke)
- Mwei, K. P. & Wando, (2012). *Effect of Computer Assisted Instruction on students Attitudes and achievement in Matrices and Transformation in secondary schools in Uasin Gishu District, Kenya*. Unpublished M.Phil.Thesis, Moi University Kenya
- Nepad e-Africa Commission, (2004). *NEPAD e-Schools initiative concept framework document*
- Orodho, A.J. and Kombo, D.K. (2002). *Research Methods*. Nairobi: Kenyatta University, Institute of Open Learning.
- Polit D.F. & Beck C.T. (2010) *Essentials of Nursing Research: Apprasing Evidence for Nursing Practice*, 7th edition. Wolters Kluwer Health / Lippincott Wasiams & Wilkins, Philadelphia.
- Republic of Kenya, (2005): Sessional Paper No. 1 of 2005. *A policy Framework for Education, Training and Research*. Nairobi: Government Printers.
- Republic of Kenya, (2010): *Ministry of Education ICT guidelines for Educational Institutions. On Integration, Infrastructure and Acquisition*. By integration Team September 2010: MOEST.
- Rogers, E.M. (2003). *Diffusion of innovations* (5th Ed.). New York: Free Press.
- Simiyu C.P, Mutsotso S.and Masibo E. (2019): Influence of Technical Surpport on ICT Integration in Classroom Practices in Public Primary Schools in Bugoma County, Kenya. *International Journal of Science and Research*.
- Yildirim, S. (2007): Current Utilization of ICT in Turkish Basic Schools. A review of teacher's ICT Uses and Barriers to Integration. *International Journal of Instructional Media*, 34,171-186.
- Yilmaz, N. P (2011) Evaluation of the Technology Integration Process in the Turkish Education System. *Contemporary Educational Technology*, 2, 37-54