

**IMPACT OF IMPLEMENTING INFORMATION TECHNOLOGY ON TEACHING IN
PUBLIC SECONDARY SCHOOLS IN MBEERE SUB-COUNTY, EMBU COUNTY,
KENYA**

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ABSTRACT

The significant role of information and communication technology (ICT) in education has been improving and the Kenyan Government has developed policies and initiatives to institute the use of ICT's in schools and this study therefore sought to establish the impact of implementing information technology on teaching in public secondary schools by examining the impact of ICT in teaching. The findings of the study showed that although the government established ICT policies to enhance use of ICT, secondary schools in the Sub County have not adequately implemented ICT in teaching, with the study showing that teachers lacked the necessary skills for the ICT uptake, though they have the will and commitment to roll out the ICT policy as directed by the Ministry. The study recommends that teachers need to be supported through training on ICT skills necessary for teaching, and that computer applications to form part of the teacher training curriculum.

Key words: Teacher, ICT, public secondary, ICT policy, ICT skills, workload

1.1 Background of the Study

Information Communication Technology (ICT) skills are key in promoting the economic development of a county. It is for this reason that Kenya established strategic plan known as Vision 2030 with the aim of transforming the country in a middle income country by the year 2030. According to Sessional paper of 1 of 2005, many productivity gains in the developed world economies can be attributed to the impact of ICT. Information Communication Technology comprises of technology that create, disseminate, store and transmit information within the information cycle. Manichander (2015) points out that in recent years attention has been paid on how the power of computers can be utilized to promote efficiency in education all levels, whether formal or otherwise. ICT in schools is applied in the classroom teaching for the dissemination of knowledge and managerial use in managing information about the teaching staff and students (Cairncross and Pöysti, 2006).

Other frequent and significant applications of computers in the school setting include timetabling, students' data control, management of staff data, accounting, library, stores management, secretarial services and preparation and management of examination results. Many countries in the world have recognized the important role of Information and Communication Technology (ICT) in improving education and have invested heavily in increasing the number of computers in schools and in the networking of classrooms (Kangro & Kangro, 2004). Cairncross & Pöysti, (2004) also agree that the usage of computers in teaching and learning is yet to be achieved. In developing countries, use of computers and the internet is still in its early stages of development due to poor existing infrastructure and the high of access. However, most developing countries have realized the need for using ICT in various sectors of the economy and have come up with strategies and initiatives for ICT usage (UNSECO, 2010).

The study further points out that in South Asian region, there have been various Government initiatives, International Agencies and Non-Governmental Organizations with activities geared towards generating awareness and providing quality Training for ICT in education. It is noted that most of the countries in the South Asia region have realized the need for training teachers in ICT and have launched various professional development initiatives, though many of these training activities focus mainly on computer literacy instead of enabling teachers to integrate ICT in teaching activities and master the use of ICT as an effective tool to improve teaching and learning. In India, various schemes and programmes have been initiated both at Government and non-governmental levels for developing ICT skills in teachers to deploy technologies that enhance the quality of teaching and learning.

In Nigeria, Aduwa observed that a great deal of instructional and administrative work in secondary schools is still carried out manually. Thus, they carried out a research study to examine the major obstacles militating against the use of ICT in secondary education in Nigeria. The research study established that high cost of computer hardware and software, weak infrastructure, lack of human skills and knowledge in ICT as the major stumbling block to the integration of ICT in secondary education in Nigeria. The study also revealed that secondary schools in Nigeria are not given sufficient funds to provide for the required infrastructure and, teaching and learning resources such as furniture, adequate classrooms, and relevant textbooks leave alone being given adequate funds for ICT facilities. They pointed out that the cost of subscribing to the internet is too high for many of the impoverished secondary schools in Nigeria to afford. Olojede (n.d) also points out that there is a paradigm shift in Nigeria and education now depends on effective use of new teaching and learning technologies for instruction. Educators are advancing ICT competency-based instruction on realization that traditional

methods of instruction are becoming obsolete with the introduction of electronic and other sophisticated methods of instruction. Other countries such as the Republic of Rwanda has embraced One Laptop Per Child (OLPC) policy in the year 2000, where President Paul Kagame and Government of Rwanda established a set of objectives to transform the country into an industrialized service-based economy in 20 years and among the six pillars of the plan is science and technology including Information And Communication Technology (Republic of Rwanda, 2010). Warshauer & Ames (2010) point out that OLPC was rolled out in January, 2007 to children aged between 11-12 years and 750 laptops were distributed, and the government of Rwanda intends to distribute half a million laptops to primary school pupils by the year 2017. In line with rapid changes in the society, use of information and communication Technology in education is the sure way which learners' achievement can be enhanced. The Kenya National ICT policy that was formulated in 2006 was aimed towards promoting quality education and to improve the operations of Kenyans by providing efficient, reliable and affordable ICT services (MoEST, 2006). There are other organizations in the private sector that also participated in initiatives and introduction of ICT in schools. For instance, the New Partnership for Africa Development (NEPAD) and Cyber e-Schools, the Technology Solutions Company (CSTS) Programme. The objective of the programme was to integrate ICT in the education curriculum delivery for all levels of education, with the plan to improve quality, equity and access to education. A second effort was the digitization of curriculum content by Kenya Institute of Curriculum Development (KICD) initiated in 2009 and it is still ongoing. Many factors have been identified to contribute to the implementation of ICTs skills in teaching and learning. It is noted that the factors that can contribute to the successful use of ICT in schools include the availability of ICT resources; training of teachers in ICT skills; and general teaching

methodologies (Becta, 2003). This research thus sought to evaluate the strategies of implementing ICT in teaching in public secondary schools in Mbeere Sub-County, Embu County.

1.2 Statement of the Problem

Information and Communication Technology (ICT) has impacted on almost every facet of our daily activities and in all sectors with education included. Many countries have invested greatly and vigorously towards the integration of ICT in their education systems. This is in pursuit and with the aim to be in line with the rapid technological changes associated with knowledge economy leading to high economic growth (Keiyoro, 2010). In Mbeere County, low implementation of ICT strategies are lacking, or poorly implemented leading to reduced benefits of the strategies towards complementing education performance. For instance, among the sub-counties that benefited from ESP was Mbeere Sub-County. In order to find out whether the government initiative through ESP project of introducing computers in public secondary schools met the expected outcomes, it was necessary to carry out a research study to evaluate the realities of the strategies of implementation of use of ICT in teaching in Mbeere Sub-County.

1.3 Objectives of the Study

The study is based on the following objectives;

- i. To assess the teacher training strategies that is used in implementing ICT in teaching in public secondary schools in Mbeere South Sub-County, Embu County.
- ii. To examine the existing ICT skills among teachers that are relevant to implementing ICT in teaching in public secondary schools in Mbeere South Sub-County Embu County.

- iii. To assess the teacher workloads and motivations to increase the uptake of ICT in teaching in public secondary schools in Mbeere south sub-county.
- iv. to identify the reasons for low uptake of computer technology in teaching in public secondary schools in Mbeere South sub-county.

2.1 Literature Review

2.2 Use of ICT in Schools

The Information and communication technology has been incorporated in teaching, learning and management of schools. Like in other sectors on the knowledge economy, it is believed that that ICT in education will improve the efficiency of the systems and hence making it easier to achieve the set objectives. According to Look (2005), contemporary research on the use of technology in education, it was consistently found that students who used technology experienced positive effects on performance in all subject areas. Becta (2004) also urges that ICT technologies provide fast and accurate feedback to students, and speed up computations and information searching which leads to improvement in performance.

Bingimlas (2009) argues that, integrating ICT into teaching and learning is a complex process and argues that many institutions encounter a number of challenges. Bingimlas further point out that there are many challenges that make it difficult for schools to make progress or to achieve an objective. In another study, Chigona and Chigona (2010) found out that, integrating ICT in the delivery of curriculum was low in Kenyan schools, hence leading to students and teachers being deprived of opportunity to receive quality education by use of technology. Strategies that could be used in implementing and promoting ICT use in schools are as diverse. Identification of the factors is therefore a key step in devising the appropriate strategies.

Various studies have been carried out on what influences decisions to use ICT in delivery of curriculum, and they are identified as manipulative and non-manipulative factors. Non-manipulative factors refer to those factors the school may not directly influence. This include; government policies, teaching experience and age of the teacher while manipulative factors include; teachers' attitude on using ICT in teaching and learning, ICT skills and knowledge and the extent to the school is commitment to the process of implementation which includes availability of ICT infrastructure. (Afshari et al, 2009).

2.3 Strategies Used to Enhance Use of ICT in Teaching

Many factors need to be taken into consideration to form strategies to the school ICT policy implementation process. For example in Malaysia, Vision 2020 and ICT master plan envisages the long term development plan of the country (Ministry of Education, 2009). It also focuses towards the education system reforms that are significant to the achievement of the country's objective. In partnership with non-governmental agencies, the Ministry of Education (MoE) Malaysia has developed new media programmes for use as educational, organizational and as a means of empowering learners. The Ministry of Education in Malaysia believes that ICT has ability to revolutionize education, thus it has integrated ICT into all levels of education, other systems to facilitate management and in all forms of communication. In the country's strategic plan and policy, the government of Malaysia, has focused on enabling all students to access ICT for greater achievements in education and development of the country (MoE, Malaysia, 2009).

In another study, Farrell, (2007) noted that in Uganda, some schools had been installed with computers and internet connectivity while others lack electricity supply. Farrell further observed that facilities in the twelve studied schools, around 10 to 20 computers were normally set up in a single computer lab. Farrell then noted that these facilities were scheduled to be used either twice

or thrice per week by each class and the rooms were normally congested due to large class sizes. In Kenya, Farrell, (2007) pointed out that there were schools that had only one computer which only served in the office of the instructional leader. Very few schools had close to sufficient ICT tools for teaching and learning. He also noted that even in situations where the school had some computers, the computer to student ratio was high. The finding indicated that there was a high student enrollment verses the few computers, which were supplied by the Government, parents, NGOs e- cyber schools programme. Farrell further pointed out that the attempts to establish ICT infrastructure in public primary schools has been minimal.

2.3.1 Teacher Related Skills and Training

Like various organizations, some schools have invested large amounts to purchasing new technology facilities in recent years. This leads to an expectation that teachers will use these technologies in teaching and learning in an effective way. However, Baylor and Ritche (2002), argue that despite the amount of technology and technology sophistication, technology will not be used unless teachers have the skills, knowledge and attitudes necessary to integrate it into the curriculum. Jones (2001) concurs with Baylor & Ritche that teachers should integrate technology into instruction, and he further points out that teachers' readiness to use technology determines the success level of integration and not by mere installation into the classroom. Teachers' attitudes towards ICT significantly affect the use of technologies in the teaching and learning. Lack of ICT competencies, confidence and phobia caused ICT to take a back seat against the traditional teaching and learning practices (Vannatta & Fordham, 2004). The ICT use for the benefit of the students is limited to information searching and word processing. Students themselves complain about their lack of knowledge concerning the possibilities to use ICT as a tool to support new ways of learning.

According to Fullan (2001), most of the teacher training institutions have focused mainly on developing the infrastructure needed for the implementation of ICT but the teaching and learning methods still remain to be the traditional practice. Vannatta and Fordham (2004) argued that teacher educators and administrators should not only provide extensive training on educational technology, but should also facilitate contribution to teaching improvement. In this respect, Granger and Morbey (2002) studied four schools to identify strategies that would contribute to teachers to successfully implement ICT in teaching and learning. In their findings, they concluded that successful integration of ICT in teaching required not only computers but commitment of the teachers and community involvement. Igbo (2015) added that the schools should work continually with the community in improving pedagogy that includes unique characteristics of ICT and also addressing issues of equity and privilege. Schiller (2003) pointed out that teacher characteristics such as individual's educational level, age, gender, educational experience, computer skills and financial position can influence the implementation of technologies in teaching and learning.

The report by the National Center for Education Statistics (2000) indicated that teachers who had taught for few years were more likely to use ICT in classroom instruction compared to those with several years of teaching experience. The report indicated that teachers with less than three years teaching experience were using 48% of their time on computers. Teachers with 4-9 years used 45% of their time on computer; those with 10-19 years used 47% of their time on the computers while teachers with teaching experience of 20 years and above used computers only 33% of their time. The research study concluded that the new teachers might have been exposed to computers during and before the training and thus they are comfortable and confident using the tool during classroom instruction. Albirini (2006) established that age of the teachers was not an important

factor in relation to attitude of the teacher towards ICT usage in teaching. These results showed that the age of the teachers was inversely proportional to attitudes towards ICT. The same study found that the probability that teachers would use ICT in the classroom was limited by the reality that teachers who were educated 20 years ago were trained by people who themselves were trained before the arrival of computers in schools. Furthermore, there are other personal characteristics that may influence how teachers use computer applications in their classrooms. The teacher's own learning style is certainly one such factor. For example, if a teacher is a creative thinker who likes the idea of constructing knowledge, is a life-long learner, a social learner, and a decision maker, he may be more likely to use computers in more integrative and transformational ways that are useful and valuable to students instead of ways that promote and support traditional classroom practices (Collins & Bielaczyc, 2003). The studies above are a pointer to the changing landscape of communications and information exchange in the 21st century, which requires teachers to be at the cutting edge of knowledge production, modification and application rather than consumption, and according to Afshari et al. (2009), professional development of teachers sits at the heart of any successful technology and education programme. In another study on pedagogical integration of ICT in selected secondary schools in Kenya, Gakuu and Kidombo (2010) recommends that the Ministry of Education needs to provide ICT teachers to schools. They also proposed that in order to motivate teachers who have ICT skills and are already offering ICT services, MOE need to find a way of rewarding them. To encourage teachers to acquire ICT skills, they further recommended that ICT integration in teaching should form part of teachers' annual performance appraisals. Also, they further pointed out that the teacher training institutions have inadequate institutional capacity, particularly qualified teacher trainers, to develop and provide training programs for teachers on the use of ICT in education.

At the school level, institutional leaders lack the capacity and the will to provide the necessary support to teachers to effectively incorporate ICT into their teaching and learning practices. It is for this reason that Mominó et al., (2008) posits that there are various ways in which teachers can be supported by technology. For instance, teachers are facilitated to be more efficient in lesson preparations and content delivery by use of technology facilities. The success of digital blackboards, for example, can be attributed to their ability to optimize routines, content and materials that are part of the traditional work of the teacher in the classroom (Higgins, 2010). Digital blackboards allow teachers to be more efficient in their work by simplifying the tasks of searching for digital elements, ordering them and preparing them. They also make it easier to update material and share resources with students through an educational platform.

Secondly, technology has the capacity to help teachers customize their teaching materials and methods to suit the individual students' needs. For instance, technology is facilitating new teaching and learning methods for learners with special educational needs (Maora et al., 2011). Technological solutions have led to significant improvements in learning by allowing teachers to adjust the proposed activities to the specific needs of a certain student. Similar to all other professions, teachers require constant and continuous in-service training to be effective, motivated, and are updated in skills and knowledge. While this is not a mandatory requirement in many national jurisdictions, those that do have such requirements use and see ICT as important vehicles to provide continuing professional development to teachers. The use of ICT, especially in support of distance education activities, adds enormous value to the training. Where the infrastructure exists, and connectivity costs are subsidized, the opportunity to create virtual online learning communities of teachers within nations and across regions exists. Such learning communities enable and empower trainee and practicing teachers to share experience,

curriculum, learning materials, lesson notes, and collaborative projects. ICT can be applied in at least three training contexts: basic training, upgrading and advancing pedagogical skills and content knowledge, and continuous professional development (Commonwealth of Learning & UNESCO, 2009). Higgins, (2003) points out that the main objective of integrating ICT in Education is to enhance pedagogical skills with aim of improving the quality of education. Lack of ICT infrastructure in schools affects the efforts to implementing ICT in teaching and learning practices. In the cases where the infrastructure is available, it has been noted that few educators are effectively integrating ICT in delivery of the curriculum (Becta, 2003). Further findings are that there are also non-technical factors that affect the adoption of ICT for curriculum delivery. According to Bingimlas (2009), teacher competence in ICT refers to the teacher's ability to integrate innovative pedagogical methods. Lack of competence is therefore regarded as a significant teacher related barrier to ICT integration in education. He further urges that in ICT integration, teachers play a major role in technologically based teaching and learning paradigm shift. He further points out that teachers are expected to take up their position as effective agents to ensure that technology is effectively used and yields the expected outcomes.

In Kenya, a research study was conducted on factors that affect the integration of ICT in teaching in Bungoma County. The findings showed various factors and among them are; pedagogical factors, training of the teachers on ICT skills, attitudes to change, teacher technical abilities and knowledge of ICT, teacher familiarity and usage of ICT, teacher confidence and motivation: and subject knowledge as key teacher factors that influence the extent of teacher usage of ICT in teaching and other class related activities. The study pointed out that dissatisfaction of teachers with the status quo, knowledge and skills, resources, rewards and incentives, participation,

availability of hardware and software, administrator's attitude as key factors that influence the teacher use of ICT in classroom teaching (Wanjala, Khaemba & Mukwa, 2011).

2.3.2 Teacher Workload

A number of challenges affect the effective utilization of ICTs in teaching in developing countries. Olusola & Alaba (2011) argue that among the prominent issues in Nigeria are poverty, sporadic supply of electricity and language barrier and heavy workloads, and they argue that these problems have to be tackled if the potentials of ICTs on teaching in developing countries are to be realized. Govender (2012), in a study carried out in South Africa, established that one of the main obstacles to technology implementation perceived by the teachers is the mismatch between ICT and the class time frame of the existing curricula. He further argues that by supplying computers in schools alone is not enough for attaining educational change. The introduction of ICT into education requires equal innovativeness in other aspects of education. According to Govender (2012), both policy makers and teachers share this responsibility and that policy-makers should provide additional planning time for teachers to experiment with new ICT-based approaches. He argues that this may be attained by reducing the teaching workloads for the teachers. To obtain a better result, provision of resources is necessary, not only in terms of computer equipment, but also providing the necessary infrastructure to support effective operation of these systems. Teachers require technical support, especially those that have never been exposed to these technologies before.

According to another research study carried out by Wims and Lawler (2007), in three secondary schools in the former Rift Valley Province in Kenya, the study revealed that ICT infrastructure and internet access were lacking in most schools. The study further revealed that 35-40% of secondary school teachers had never used a computer. The main issue of concern that

came out of the study included staff training, mainstreaming of ICT across the curriculum and provision of adequate ICT equipment. Jegede (2009), points out that the costs of ICT training have been identified to be high such that some schools cannot meet the expenses of training to use computers in teaching and learning. In some cases teachers who have trained in ICT have done so at their own cost and even where training has been organized by schools and computer centers, payments in many of these cases have been from their own pockets.

3.1 Research Design

In this study, the researcher used descriptive survey design. The descriptive survey describes the state of affairs, as it exists at present and is thus suitable as it allowed the researcher to administer questionnaires and interview schedules to gather data from the respondents.

3.2 Location of the Study

The study was carried out in Mbeere South Sub County in Embu County. Mbeere South borders Mbeere North, Yatta Sub-County, Machakos County to the West and Masinga to the East. The Sub-county has fifty one (51) public secondary schools and three (3) private secondary schools.

3.3 Target population

The study was carried out in public secondary schools in Mbeere South Sub County, Embu County. Data was collected from the target population of 53 secondary schools, 756 teachers, and 2860 Form Two Students in Mbeere Sub-County, Embu County.

3.4 Sample Size and Sampling Procedure

The researcher used purposive sampling to sample the six schools on the basis of having benefited from Economic Stimulus Package (ESP) where each of the selected schools received ten computers and Form one and two digital content.

Also purposive sampling was used to sample the Form two class subject teachers. The teacher sample matrix is indicated below;

Name of the school	Target population	%	Sampling Method	Sample Size	Pilot Target
Machang'a Mixed	11	20	Purposive	2	1
St. Clares Girls	9	20	Purposive	2	1
Kirima Mixed	16	20	Purposive	3	1
Nyangwa Boys	60	20	Purposive	12	2
Igumori Sec	29	20	Purposive	6	1
Ngenge Sec	12	20	Purposive	2	1
Total	127			27	7

Systematic random sampling was used to select the Form Two (2) students who were issued with questionnaires. In systematic random sampling, the subjects are selected from a list in a systematic manner. The researcher took 10% from the schools with large population of Form Two students and 20% from schools with small population of Form Two students in the selected six secondary schools, and the sample matrix is indicated below;

Name of the school	Target population	%	Sampling Method	Sample size	Pilot Target
Machang'a Mixed	46	20	Systematic	9	1
St. Clares Girls	48	20	Systematic	9	1
Kirima Mixed	115	10	Systematic	12	2
Nyangwa Boys	260	10	Systematic	26	3
Igumori Sec	117	10	Systematic	12	2
Ngenge Sec	34	20	Systematic	6	1

Total	620	74	10
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3.5 Research Instruments

The study used self-administered questionnaires for data collection. The use of questionnaires is appropriate for research studies as it has the ability to collect large amount of information in reasonable time and responses are easily analyzed. A questionnaire was used to collect quantitative data from the Form two subject teachers and the form two students on teacher and learner related strategies of implementing use of ICT in teaching and learning using Likert scale. To ensure the research instruments' consistency and validity, the researcher sought the opinion of the experts on the field of the study particularly, the researchers' supervisors and lecturers in the Department of Education of Kenya Methodist University. The reliability coefficient for the questionnaire was 0.79, and according to Creswell (2008), the acceptable values of alpha, range from 0.70 to 0.90. The questionnaires were therefore considered reliable for the study.

3.6 Data Collection Procedure

Data was collected using a questionnaire that was delivered to the respondents with a cover letter. The researcher administered the questionnaire to the pupils with assistance of the teachers in the respective schools.

3.7 Data Analysis Procedure

Data analysis process started by sorting out the questionnaires and classifying them so as to gather information per school since the school was used as the unit of analysis. Both descriptive and inferential statistics were used to analyze data obtained from the study. Descriptive statistics such as frequencies, averages, and percentages were used to analyze data on the effectiveness of

the strategies of addressing the challenges on the adoption of ICT in teaching. The results were then presented in graphs, charts and tables for ease of interpretation.

3.8 Ethical Considerations

In this study, research ethics were highly upheld. The researcher endeavored to follow the right channels for the data collection and upheld all honesty and courtesy in all the dealings, especially during the data collection. The researcher sought and received a research permit from the National Commission for Science Technology and Innovation (NACOSTI) and the Sub County Education Office in Mbeere. This allowed the researcher to visit the sample schools with the necessary documentation and authority to collect data. Confidentiality, anonymity and freedom to participate were highly regarded. The information that was obtained was solely used for the sake of the research.

4.1 Research Findings

4.1.1 Gender of the Respondents (Teachers)

Gender	Numbers	Percentage (%)
Male	48	53
Female	43	47
Total	100	100

Table 4.1 presents the gender of the 91 respondents who participated in the study. The statistics obtained indicate that the majority respondents were male at 53% and the female at 47%. This was attributed to the fact that there were more male teachers in the schools in Mbeere South sub-county than there were female counterparts.

4.1.2 Encouragement of Teachers by Departmental heads and Colleagues to use computers in Teaching and Learning.

Response	Frequency	Percentage (%)
Strongly agree	6	22.2
Agree	3	11.1
Disagree	11	40.7
Strongly disagree	7	26.0
Total	27	100

The researcher intended to establish whether the teachers get encouragement from the heads of department and other teachers as a strategy to use computers in teaching. From Table 4.2, the findings revealed that majority at 40.7% do not get encouragement and support from the head of department and other teachers. 22.2% strongly agreed that they receive encouragement and support, 26.00 % strongly disagreed and 11.1% agreed. It can be argued that the percentage that gets encouragement to use computers is mostly the teachers with ICT skills and also for the purpose of entering end of term marks.

4.1.3 Possession of ICT Skills

Response	Frequency	Percentage (%)
Strongly agree	3	9.0%
Agree	5	18.0%
Disagree	13	52.0%
Strongly disagree	6	21.0%
Total	27	100

The researcher sought to establish from the teachers on the possession of adequate ICT skills. From Fig 4.3, the study established that 52% disagreed with the statement that they have ICT skills and that they can use computers effectively. 21% strongly disagreed, 18% agreed with the

statement while 9% strongly agreed that they have been trained and can use computer effectively. This implies that majority of the teachers do not have ICT skills that are required for the implementation of ICT in teaching and learning.

4.1.4 Use of Computers in Most of the School Activities

Response	Frequency	Percentage (%)
Strongly agree	2	7.4
Agree	7	26.0
Disagree	8	29.6
Strongly disagree	10	37.0
Total	27	100

According to the information presented in table 4.4 the data shows the opinions of the teachers about computers used in all the school activities. This was meant to measure the level of computer usage and enforcement to see that they are used. 7.4% of the respondents indicated that they strongly agree that computers are used in most of the school activities by both the teachers and the students. Another 26 % stated that they agree with the statement that computers are used in most school activities. 29.6% and 37% stated that they disagree and strongly disagree respectively. The results implied that use of computers had been embraced in each of the selected schools though the degree at which this was done was relatively low.

4.1.5 Reasons for Low Uptake of Computers among Teachers

Response	Heavy workload (%)	Lack of ICT Skills %	Internet Connectivity %
Not at all	7.40	14.81	7.40
To a less extent	14.81	7.40	11.1
To a moderate extent	11.1	18.51	18.51
To a large extent	37.03	33.3	73.3
To a very large extent	30.00	73.3	37.03
Total	100	100	100

Reporting on the workload, table 4.5 showed that majority of respondents at 37.03% stated that heavy workload was an impediment to use of ICT in teaching because it affected them to a large extent. 30.0% stated that workload affect them to a very large extent, 11.1% said that it affects them to a moderate extent. 14.81% and 7.40% stated that workload affects them to a less extent and not at all respectively. The results show that heavy workload was causing teachers to have low uptake of computers and denying them time to explore or even practice more. Reporting on the ICT skills, the majority at 73.3% stated that lack of ICT skills affects them to a very large extent, 33.03 stated that lack of ICT skills affects use of ICT to a large extent, 18.51% stated that ICT skills affects to a moderate extent while 14.81% and 7.40% stated that ICT skills affects them to a less extent and not at all respectively. The results revealed that the major impediment towards use of ICT by teachers was lack of ICT competencies. For effective implementation of ICT in teaching and learning to take place in secondary schools, teachers need to be trained in computer applications and ICT related courses. Internet connectivity was found to affect use of ICT in teaching as indicated to a large extent by majority at 73.3%. 37.03% stated to a very large

extent, 18.51% stated to a moderate extent, 11.1% stated to a less extent and 7.40% stated not at all. The results show that there is need to have all schools installed with internet connectivity.

5.1 Conclusions

All the independent variables; learner related strategies, teacher related strategies and school related strategies were found to have a detrimental effect on implementation of use of ICT in teaching and learning in public secondary schools in Mbeere Sub-County. Lack of computer application basic skills among the teachers was another great impediment to the implementation and management of ICT policies in the public secondary schools in Mbeere South Sub-County. There is no way teachers who had not been adequately trained on this specific matter could be relied on successfully in rolling out the national ICT policy in public secondary schools. Yet the same teachers were charged with the responsibility of teaching the form two students to use e-contents supplied through Economic Stimulus Package (ESP). They also lack confidence in facing students to answer their questions on computer applications. Some of the schools privileged to have trained personnel; they were put on other demanding areas such as the posting the examination results and other administrative duties. However, lack of teachers trained in ICT skills, lack of adequate ICT facilities and internet connectivity was a major impediment in the whole process of ICT implementation in Mbeere South Sub-county. The heavy workload for secondary school teacher's was cited as another reason why teacher uptake of ICT is minimal, and the training was very low teachers cited another reason why teachers don't actively undertake ICT training in Mbeere Sub County. The study concludes that schools in Mbeere Sub County, Embu County have not fully implemented the government ICT policy in teaching and learning. This is depicted by the results of the study that revealed that the schools were not

adequately equipped with ICT facilities and internet connectivity, while some schools also lacked computer labs.

5.2 Recommendations

The study concludes that schools in Mbeere Sub County, Embu County have not fully implemented the government ICT policy in teaching. The Ministry of Education, Science and Technology should help in the rationalization of teacher loading so as to leave with adequate time to train in ICT skills which can impact positively in the performance of other teachers. Teachers who had acquired ICT skills were few and were assigned other administrative duties while others took up different jobs in other sectors. Majority of the teachers lacked ICT skills had no confidence and thus they could not use computers in teaching and learning process. It is also recommended that training on computer applications should be considered to form part of the secondary school teacher training curriculum so that the teachers who graduate are able to apply the skills during teaching.

5.4 Areas for Further Research

The results from the study pointed out a number of opportunities for further research;

- A study on e-computer content on learning should be conducted to come up with global content which will make a graduate in ICT technology gain employment.
- Interventions and areas that need further in-service training.
- ICT usage in other schools other than the ones that benefited from ESP programme, and should be mandated to cover the whole country and make Kenyan graduates competitive in the international market.

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