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# Effects of Teachers' Experience and Training on Implementation of Information Communication Technology in Public Secondary Schools in Nyeri, Central District, Kenya

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***Abstract:*** *The purpose of the study was to investigate the effects of teachers' demographic variables on implementation of Information Communication Technology in public secondary schools in Nyeri Central district, Kenya. The dependent variable was implementation of ICT and the independent variables were teachers' teaching experience and training. The research design used was descriptive survey design. The target population was 275 teachers working in 15 public secondary schools in Nyeri Central district. The sampling design was stratified random sampling and sample size was 82 teachers. The study targeted 15 principals of the schools in Nyeri Central district. The data collection tools were questionnaires, interview schedule and observation schedule. Data were analyzed quantitatively and qualitatively. Teachers' training in ICT and teaching experience are not consistent in affecting ICT implementation. Many schools especially in rural areas had not embraced ICT mainly because teachers lacked adequate training, had lower levels of education, and had negative attitude towards ICT implementation. This has led to schools facing major challenges in ICT implementation. The researcher recommends that Public secondary schools should find a way to purchase more ICT facilities and support teachers' training on the use of ICT. The government needs to give more financial support through free education programme and donations to enhance ICT implementation in public secondary schools. The teachers should change their attitude towards the use and implementation of ICT in the schools so as to create information technology culture in all aspects of teaching and learning.*
***Wachiuri Reuben Nguyo***
***Keywords:*** *Teachers' Experience and Teacher Training, Information Communication Technology, Curriculum Implementation*

## I. Introduction

Information Communication Technologies (ICT) are defined as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. Thus, ICT is an umbrella term that includes any communication device or application, encompassing; projector, radio, television, cellular phones, computer, internet network hardware and software, satellite systems and various services associated with them for example video conferencing and distance learning (Tinio,2003) .According to Mingaine (2013) the implementation of ICT in schools in developing countries remains very limited despite a decade of considerable large investments in the technology.

Kenya continues to struggle with high levels of poverty that has affected implementation of the technology in schools (Ncunge et al, 2012) According to Jimoyiannis, &Komis, (2007) countries like UK, Singapore, China, Australia, European Union (EU), have established programs that aim at enhancing teachers' skills important in adapting and using ICT during teaching and learning processes. Many researchers consider designing and integrating efficient ICT teacher preparation programs as a key aspect to essential and successful, wide-ranging school reforms (Khan et al,2012).According to Waema (2002) several African countries like Egypt, Mauritius, Rwanda, and South Africa have developed comprehensive national policies and strategies to fully implement Information Technologies in education. Kenya is one of the few developing countries where ICT implementation in education is considerably more recent in that, the integration of ICT to education was done in 2005 in line with Sessional Paper No.1 of 2005 (Republic of Kenya, 2005).

Mingaine (2013) study established that there was limited supply of qualified ICT teachers in Kenya. Mioduser, Turksapa and Leitner (2000) reported that demographic factors such as age, gender, teachers' experience and teachers' level of education greatly affected the speed at which ICT was conceived and implemented at Greece.

### 1.2 Statement of the problem

According to Gathano (2009) demographic factors such as teachers' level of education, teachers' training on ICT and teaching experience are important in the implementation of ICT in Kiambu County.

Gichoya (2005) study in Nyeri County reported that the greatest barrier that impedes the implementation of ICT in any government institution in Kenya lies heavily with the key implementers and that their demographic variables might positively or negatively influence ICT implementation on the ground.

Records from the District Education Office in Nyeri County show that out of 275 teachers only nine are fully conversant with ICT. Ministry of Education ICT section has been involved in the training of at least three teachers in use of ICT in every county because the number of teachers who are knowledgeable in new ICT is minimal. This is the reason why many teachers avoid using computers for recording information and when they do it, they do it wrongly. Consequently this hinders the implementation of ICT. Through Strengthening Mathematics and Sciences in Secondary schools teachers are supposed to be taught how to use ICT.

**1.3 Purpose of the study**

The purpose of the study was to investigate the effects of teachers 'teaching experience and training on implementation of ICT in public secondary schools in Nyeri County.

**1.4 Objectives of the study**

The study sought to achieve the following objective

i. To determine the influence of teachers' teaching experience and training on the implementation of ICT in Public secondary schools.

**1.5 Research question**

The study sought to answer the following research question

i. What is the influence of teachers' teaching experience and training on the implementation of ICT in Public Secondary schools?

## II. Literature Review

**Influence of teaching experience on ICT implementation**

Several studies have been conducted that addressed the relationships between selected demographic variables such as teaching experience and usage of computer. One such study was Zidon and Miller (2002) who found weak relationship existed between years of teaching with computer usage. Conversely, in a study of teachers usage of computers, Martin and Lundstrom (2002) found that almost 60% of the teachers in their study who had under 10 years of teaching experience believed computers in the classroom were essential and hence they use it extensively, while only 25% of teachers with over 20 years of teaching experience shared this belief.

Bhattacherjee&Prekumar (2004) demonstrated that people experience plays a vital in their initial acceptance towards a system in question. Research has shown that experience with the use of technology has an influence on intention to use and actual use of information technology (Thompson 2006). However some research reported that teachers' experience in teaching did not influence their use of computer technology in teaching (Niederhauser&Stoddart, 2001).Gorder (2008) reported that teacher experience is significantly correlated with the actual use of technology. In her study, she revealed that effective use of computer was related to technological comfort levels and the liberty to shape instruction to teacher-perceived student needs.

Meta-analysis and review of 81 research studies by Rosen and Maguire (1990) concluded that teachers teaching experience does not eliminate computer phobias and many experienced teachers display some wariness, discomfort and/or mild anxiety in relation to computers. Over the years, computer usage issues related to various subjects taught have been debated in the literature. Though some research reported that teachers' experience in teaching did not influence their use of computer technology in teaching (Niederhauser&Stoddart, 2001).Most research showed that teaching experience influence the successful use of ICT in classrooms (Wong & Li, 2008;Giordano, 2007; Hernandez-Ramos, 2005).

Nevertheless, Baek, Jong & Kim (2008) claimed that experienced teachers are less ready to integrate ICT into their teaching.Similarly, in United States, the (U.S National Centre for Education Statistics, 2000) reported that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching. According to the report, teachers with up to three years teaching experience reported spending 48% of their time utilizing computers, teachers with teaching experience between 4 and 9 years, spend 45% of their time utilizing computers, teachers with experience between 10 and 19 years spend 47% of the time, and finally teachers with more than 20 years teaching experience utilize computers 33% of their time. The reason to this disparity may be that fresh teachers are more experienced in using the technology.

Further, Lau &Sim (2008) conducted a study on the extent of ICT adoption among 250secondary school teachers in Malaysia. Their findings revealed that older teachers frequently use computer technology in the classrooms more than the younger teachers. The major reason could be that the older teachers having rich

experience in teaching, classroom management and also competent in the use of computers can easily integrate ICT into their teaching. The result is in agreement with Russell, Bebell, O'Dwyer, & O'Connor, (2003) who found that new teachers who were highly skilled with technology more than older teachers did not incorporate ICT in their teaching. The researchers cited two reasons: new teachers focus could be on how to use ICT instead of how to incorporate ICT in their teaching. Secondly, new teachers could experience some challenges in their first few years of teaching and spend most of their time in familiarizing themselves with school's curriculum and classroom management.

But in a survey of almost 3000 teachers, Russell, O'Dwyer, Bebell and Tao (2007) argued that the quality of ICT integration was related to the years of teacher service. However, Granger, Morbey, Lotherington, Owston and Wideman (2002) conducted a qualitative survey on factors contributing to teachers' successful implementation of ICT in Canada. They interviewed 60respondents from 12 schools. The findings found no relationship between teachers' teaching experience and experience in the use of ICT implying that teachers' ICT skills and successful implementation is complex and not a clear predictor of ICT integration.

Several studies have been conducted that addressed the relationships between selected demographic variables such as teaching experience and subjects taught and usage of computer. The results obtained above showed that there were mixed results on the relationship between teachers' experience and ICT implementation. Some studies showed that there were significant difference between ICT implementation and teachers' experience while other studies showed the opposite. For this reason the researcher wants to conduct a further research on the same.

**Influence of training in computer usage on ICT Implementation**

Professional development of teachers sits at the heart of any successful technology and education program. Teachers' professional development is a key factor to successful integration of computers into classroom teaching. Many school leaders perceive the lack of ICT related knowledge of teachers as one of the main impediments to the realization of their ICT related goals (Pelgrum et al, 2002). One of the pertinent factors contributing to the usage of computer is that teachers need to be computer literate and thus be given appropriate training in computer usage (Ropp, 1999). Different people hold different views about computer literacy. They are those who take a literal interpretation of computer literacy. They regard writing and reading computer programs as the basic skill of a computer-literate person. Training too plays an important role in a teacher's readiness to use computers (Gan, 2001). With regards to the issue of having attended formal computer courses, it was identified through numerous studies that there is a significant relationship between usage of computers and computer training (Wong et al., 2002; Sia, 2000).

Venezky (2004) found that professional development was one of the most important support in most schools for ICT integration into teaching as it has the greatest impact on the beliefs and practice ofteachers and yet professional development time was not budgeted for in many schools in the study. Baylor and Ritchie (2002) carried out a quantitative study that looked at the factors facilitating teachers' skill, teacher morale, and perceived student learning in technology-using classrooms. They found that professional development has a significant influence on how well ICT is embraced in the classroom. Ghodke (2012) found that as compared to mathematics teachers, science teachers' perceived professional development needs of ICT use in context to teaching and learning is significantly higher. But both mathematics and science teachers ranked professional development needs at the second place. Sandholtz& Reilly (2004) claim that teachers' technology skills are strong determinant of ICT integration, but they are not conditions for effective use of technology in theclassroom. They argue that training programs that concentrate on ICT pedagogical training instead of technical issues and effective technical support, help teachers apply technologies in teaching and learning.

According to Schaffer and Richardson (2004), when technology is introduced into teacher education programs, the emphasis is often on teaching about technology instead of teaching with technology. Hence, inadequate preparation to use technology is one of the reasons that teachers do not systematically use computers in their classes. Teachers need to be given opportunities to practice using technology during their teacher training programs so that they can see ways in which technology can be used to augment their classroom activities. Teachers are more likely to integrate ICT in their courses, when professional training in the use of ICT provides them time to practice with the technology and to learn, share and collaborate with colleagues similarly, research has shown that teachers require expert in technology to show them the way to integrate ICT to facilitate students' learning (Plair, 2008). Teachers' understanding of content knowledge and how to apply technology to support students' learning and attainment are joined to their increase in knowledge level, confidence and attitudes towards technology. Educators who integrate technology with new teaching practices gained through professional training can transform the performance of the students (Lawless & Pellegrino, 2007). According to (Chen,2008),professional training courses must be designed to identify beliefs about successful teaching, policies for enhanced teaching and learning and syllabus design for teaching purposes. Teachers who are committed to professional development activities gain knowledge of ICT integration and

classroom technology organization (Wepner, Tao &Ziomek, 2006). Clearly, it is imperative to allow teacher trainees to apply ICT in their programs when in school in order to be able to use the technology to supplement their teaching activities. Teachers when given time to practice with the technology, learn, share and collaborate with peer, it is likely that they will integrate the technology into their teaching. Training programs for teachers that embrace educational practices and strategies to address beliefs, skills and knowledge improve teachers' awareness and insights in advance, in relation to transformations in classroom activities should be encouraged (Levin &Wadmany, 2008)

Training makes a positive difference to those who receive it. Angers and Machtmes (2005) state that teachers who receive eleven or more hours of curriculum-integration training are five times more likely to say they believe they are much better prepared to integrate technology into their classroom lessons than teachers who received no such training. Teachers receiving more training of either type, but especially of integration training, are more likely to use software to enhance instruction in their classrooms. The empirical findings provided an insight that the variable training in computer usage has a positive impact on Actual Usage of Computer(AUC). The number of computer skills acquired by teachers', its being current, and the number of hours of formal training play an important role in positioning the AUC of teachers' in a higher level. When teachers are being trained the expertise expected increases in competence. It was realized that being skilled in ICT does not improve teachers' classroom teaching efficiency (Yuen & Ma, 2002).

Teachers' professional development is a key factor to successful integration of computers into classroom teaching. Several studies have revealed that whether beginner or experienced ICT related training programs develop teachers' competences in computer use (Bauer &Kenton,2005; Franklin, 2007; Wozney et al., 2006), influence teachers' attitudes towards computers (Hew and Brush, 2007; Keengwe and Onchwari, 2008) as well as assisting teachers reorganize the task of technology and how new technology tools are significant in student learning (Plair, 2008).Muller and his colleagues (2008) related technology training to successful integration oftechnology in the classroom.

In a study of 400 pre-tertiary teachers, they showed thatprofessional development and the continuing support of good practice are among the greatest determinants of successful ICT integration. Sandholtz& Reilly (2004) claim that teachers' technology skills are strong determinant of ICT integration, but they are not conditions for effective use of technology in the classroom. They argue that training programs that concentrate on ICT pedagogical training instead of technical issues and effective technical support, help teachers apply technologies in teaching and learning.

Research studies revealed that quality professional training program helps teachers implement technology and transform teaching practices (Brinkerhoff, 2006; Diehl, 2005). Lawless and Pellegrino (2007) claim that if training program is of high quality, the period for training lasts longer, new technologies for teaching and learning are offered, educators are eagerly involved unimportant context activities, teamwork among colleagues is improved and has clear vision for students attainment. Teachers may adopt and integrate ICT into their teaching when training programs concentrate on subject matter, values and the technology.

Similarly, research has shown that teachers require expert in technology to show them the way to integrate ICT to facilitate students' learning (Plair, 2008). Teachers' understanding of content knowledge and how to apply technology to support students' learning and attainment are joined to their increase in knowledge level, confidence and attitudes towards technology. Educators who integrate technology with new teaching practices gained through professional training can transform the performance of the students (Lawless & Pellegrino, 2007). Andoh (2012) in his research found out that teachers' professional development is a key factor to successful integration of computers into classroom teaching.

The barrier to ICT integration most frequently referred to in the literature is lack of effective training (Albirini, 2006; Balanskat et al., 2006; Beggs, 2000; Özden, 2007; Schoepp, 2005; Sicilia, 2005;Toprakci, 2006).One finding of Pelgrum's (2001) study was that there were not enough training opportunities for teachers in the use of ICTs in a classroom environment. Similarly, Beggs (2000) found that one of the top three barriers to teachers' use of ICT in teaching students was the lack of training. Recent research in Turkey found that the main problem with the implementation of new ICT in science was the insufficient amount of in-service training programs for science teachers (Özden, 2007), and Toprakci (2006) concluded that limited teacher training in the use of ICT in Turkish schools is an obstacle. According to Becta (2004), the issue of training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These were time for training, pedagogical training, skills training, and an ICT use in initial teacher training.

Correspondingly, recent research by Gomes(2005) relating to science education concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom, and lack of training concerning the use of technologies in science specific areas were obstacles to using new technologies in classroom practice. Some of the Saudi Arabian studies reported similar reasons for failures in using educational technologies: the weakness of teacher training in the use of computers, the use of a "delivery"

teaching style instead of investment in modern technology (Alhamd, Alotaibi, Motwaly, &Zyadah, 2004), as well as the shortage of teachers who are qualified to use the technology confidently (Sager,2002).

Providing pedagogical training for teachers, rather than simply training them to use ICT tools, is an important issue (Becta, 2004). Cox et al. (1999a) argue that if teachers are to be convinced of the value of using ICT in their teaching, their training should focus on the pedagogical issues. The results of the research by Cox et al. (1999a) showed that after teachers had attended professional development courses in ICT they still did not know how to use ICT in their classrooms; instead they just knew how to run a computer and set up a printer. They explained that this is because the courses only focused on teachers acquiring basic ICT skills and did not often teach teachers how to develop the pedagogical aspects of ICT. In line with the research by Cox et al. (1999a), Balanskat et al. (2006) indicated that inappropriate teacher training is not helping teachers to use ICT in their classrooms and in preparing lessons. They assert that this is because training programmes donot focus on teachers' pedagogical practices in relation to ICT but on the development of ICT skills.

However, beside the need for pedagogical training, according to Becta (2004), it is still necessary to train teachers in specific ICT skills. Schoepp (2005) claims that when new technologies need to be integrated in the classroom, teachers have to be trained in the use of these particular ICTs. According to Newhouse (2002), some initial training is needed for teachers to develop appropriate skills, knowledge, and attitudes regarding the effective use of computers to support learning by their students. He argued that this also requires continuing provision of professional development to maintain appropriate skills and knowledge. Fundamentally, when there are new tools and approaches to teaching, teacher training is essential (Osborne & Hennessy, 2003) if they are to integrate these into their teaching.

However, according to Balanskat et al. (2006), inadequate or inappropriate training leads to teachers being neither sufficiently prepared nor sufficiently confident to carry out full integration of ICT in the classroom. Newhouse (2002), states that "teachers need to not only be computer literate but they also need to develop skills in integrating computer use into their teaching/learning programmes" (p. 45).According to Newhouse (2002), teachers need training in technology education (focusing on the study of technologies themselves) and educational technology (support for teaching in the classroom). Similarity, Sicilia (2005) found that teachers want to learn how to use new technologies in their classrooms but the lack of opportunities for professional development obstructed them from integrating technology in certain subjects such as science or maths.

Other problematic issues related to professional development in ICT are that training courses are not differentiated to meet the specific learning needs of teachers and the sessions are not regularly updated (Balanskat et al. 2006). Pre-service teacher education can also play a significant role in providing opportunities for experimentation with ICT before using it in classroom teaching (Albirini, 2006). Lack of an ICT focus in initial teacher education is a barrier to teachers' use of what is available in the classroom during teaching practice (Becta, 2004).

Bingimlas (2009) in his research findings noted teachers have a strong desire for the integration of ICT into education but that they encountered many barriers to it. The major barriers were lack of confidence, lack of competence, and lack of access to resources. Since confidence, competence and accessibility have been found to be critical components for technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided for teachers. No one component in itself is sufficient to produce good teaching. However, the presence of all components increases the likelihood of excellent integration of ICT in learning and teaching opportunities.

Nyambane and Nzuki (2014) in their study observed that on the school level, factors such as professional development, accessibility of ICT resources, leadership and technical support facilities influence teachers' adoption and integration of technologies into their classrooms. Teachers' professional development is a key factor to successful integration of computers into classroom teaching. ICT related training programs develop teachers' competences in computer use (Bauer & Kenton, 2005)

The book of Turkish Ministry of National Education (MoNE) for the standardization of teachers claims that the teachers have to integrate information and communication technologies with teaching and learning processes. Besides, the teachers should not only point out how they use ICT at their teaching and learning environments in their lesson plans, but also use these technologies to support the student centered strategies (MoNE, 2009c). However, integrating technology into teaching cannot be achieved overnight. Several researchers indicate that the teachers are supposed to overcome some stages (Mills &Tincher, 2003; Proctor, Watson, & Finger, 2004; Russell, O'Dwyer, Bebell, & Tao, 2007; Yang & Huang, 2008). A meta-analytic review by HixonveBuckenmeyer (2009) summarized these stages. At first stages, the teachers tend to use the technology almost not at all, however later on; they consider the technology as an instrument which necessities to be taught. As the use of technology increases, they tend to perceive it as an instrument to aid the instruction, rather than being a core educational topic (Hixon&Buckenmeyer, 2009).

There are voluminous studies regarding the effect of professional development (PD) programs on TI. Some of these indicate that, PD programs increase TI (Giordano, 2008; Lavonen, Juuti, Aksela, &Meisalo, 2006; Voogt, Almekinders, van den Akker, &Moonen, 2005). Giordano (2008) found that, at the end of PD program, teachers began to use internet for instructional purposes and later on this usage became permanent. Lavonen et al. (2006) found that, after the PD program technology usage skills of science teachers have been increased and they managed to integrate the technology with the learning environments. Voogt et al. (2005) found that, after completing PD program, teachers' attitude towards using the computer was changed in a positive manner. Furthermore, at the end of this PD program the technology using skills of teachers increased and they managed to integrate ICT with teaching and learning environments.

On the other hand, some studies claimed that, while PD programs are increasing computer skills of teachers, the usage of ICT in education was effected still at a rather limited level (Brinkerhoff, 2006; Fragkouli & Hammond, 2007; Glazer, Hannafin, Polly, & Rich, 2009; Yurdakul, Yıldız, Çakar, & Uslu, 2010). Brinkerhoff (2006) found that, while a significant change occurred in both self-assessed technology skills and computer self-efficacy of participants, very little or no change was determined in self-assessed TI beliefs of these teachers. Frankoli and Hammond (2007) found that, the PD program induced a positive impact not only on developing the information technology skills of teachers, but also on their familiarity with ICT as a curricular tool to some degree while, it had a very limited impact on the classroom practice. Glazer et al. (2009) found that, while most of the teachers, who entered the PD program, expanded their knowledge, skills, ideas, and their lesson plan repertoire through these learning experiences; only a one-third of them were considered as proficient apprentices at the end of the study. Meanwhile, Yurdakul et al. (2010) also revealed that, the PD program was capable of increasing the technology usage skills, whereas it failed to induce substantial change for the technology integration.

Uslue and Bumen (2012) In their research study observed that after professional development (PD) program, the teachers' technology usage for preparation of education and instruction were increased, both in-classroom (sub-dimension -4)-and out-classroom (sub-dimension -1) settings. This result is parallel with the studies revealing that the in-service training programs increase the teachers' technology usage for preparation of education and instruction both in-classroom and out-classroom environments (Russell et al., 2007; Van Braak et al., 2004). The teachers who attended the assessed PD program, inclined to motivate their students for using information technologies in a greater degree (sub-dimension -2). Brinkerhoff (2006) stated that, the teachers who attended to the PD programs encouraged their students for technology usage. The increase of technology usage in ITP participant teachers was also transferred to their students, according to consideration of teachers; the students' technology usage was increased (sub-dimension 3). This result is parallel to the Brinkerhoff (2006).

In this study it was observed that the TI was increased and that was sustained after a six weeks period. Lavonenet al. (2006) indicated that the teachers didn't stop using ICT when they started to use it for instruction. Many factors may contribute to these effects. First of all, the long duration of PD program may have contributed to this increase in TI. The related literature implies the ineffectiveness of one-shot PD programs (Sandholtz, 2002). The PD program was scheduled as 30 hours for Web 2.0 course and 60 hours for ITP, a total of 90 hours timetablefor five weeks. McGarr and O'Brien (2007) stated that the PD programs aimed only to increase the technology usage skills were ineffective for integrating with the technology. At this PD program it was aimed to increase both technology usage skills and also pedagogical skills for TI. During the first week for 30 hours, the teachers were instructed to learn the basic Web 2.0. technologies, which they would be able to use with their students. These activities might have contributed to enhance the teachers' skills and their confidence for using the ICT.

Thereafter, the teachers discussed how to use these technologies for instructional purposes during the last 60 hours in the ITP. Glazer et al. (2009) examined which kind of interactions influenced the peer-teacher efforts for integrating the technology in their classrooms and they found; "sharing ideas", "giving and seeking advice", "posing and responding to task based questions" were the most used ones. Correspondingly, during the ITP, the teachers were required to communicate, share documents, and to collaborate via internet with the other teacher sand instructor of the course. These interactions may contribute TI level of teachers. Besides, the inscription of lesson plans by the participant teachers on a collaborative, team-work manner, explaining how the teachers would implement these technologies in their classes might have positively affected the TI too. O'murchu (as cited in Karagiorgi & Charalambous, 2006) indicated that the social and collaborative dimension of PD increased the effectiveness of program. Retention tests were conducted six weeks later after completing the PD program. The findings of these tests demonstrated that, the teachers' increased level of integration with the technology as a consequence of the PD program was retained after six weeks. This result is consistent with the studies in the literature (Giordano, 2008;Lavonen et al., 2006), indicates that increment at the level of TI is sustainable. The results obtained above showed that there were mixed results on the relationship between teachers' training and ICT implementation. Majority of the studies showed that there were significant difference

between ICT implementation and teachers' training while few studies showed the opposite. For this reason the researcher wants to conduct a further research on the same.

## III. Research Methodology

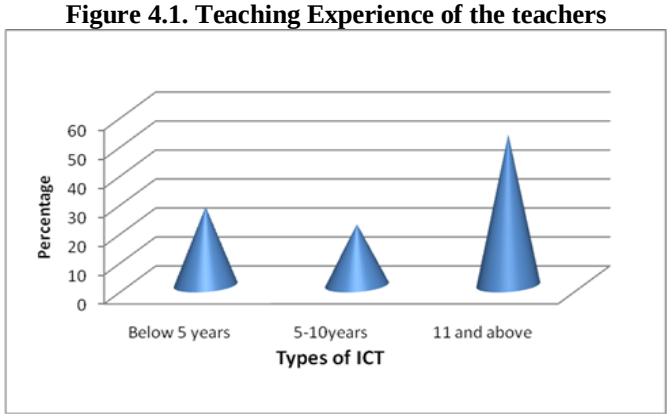
The study used descriptive survey research design which according to Kothari (2011) is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. According to Kothari (2011) descriptive research design is used because accurate information can be obtained for large number of people with a small sample. It is used to explore relationship between variables and allows generalizations across populations. The design is suitable for this study because it is used to explore and evaluate in details the teachers' gender influencing ICT implementation.

Kombo and Tromp (2006) state that population refers to the larger group from which a sample is taken. According to Nyeri County Education Offices (2011) statistics section there were a total of 15 public secondary schools. The 26 target population for this study was 275 teachers and principals from the 15 public secondary schools. Stratified random sampling was used in selecting one teacher from every department. Purposive sampling was done to select 15 computer teachers.

**Findings and Discussions**

**Teaching experience of the teachers:** It was necessary for the researcher to find out the effects of teaching experience on the ICT implementation in public secondary schools.

**Figure 4.1. Teaching Experience of the teachers**

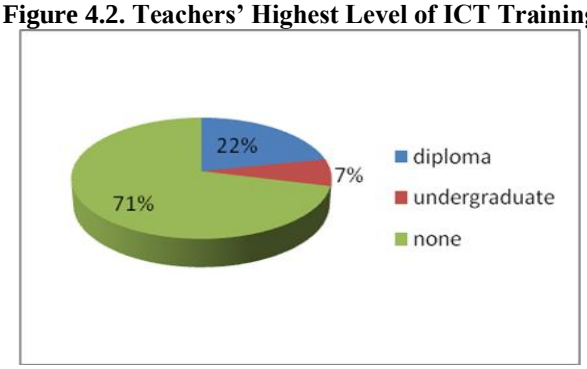



From the findings 52% of the teachers respondents had 11 years and above of teaching experience, 27% had the teaching experience below 5 years while 21% of the teachers had taught between five to 10 years. The government initially employed many teachers and majority of them did not change careers from teaching profession to others. Today government employs limited number of teachers to replace those who have retired and those who have passed on.

**Teachers' highest level of ICT training**

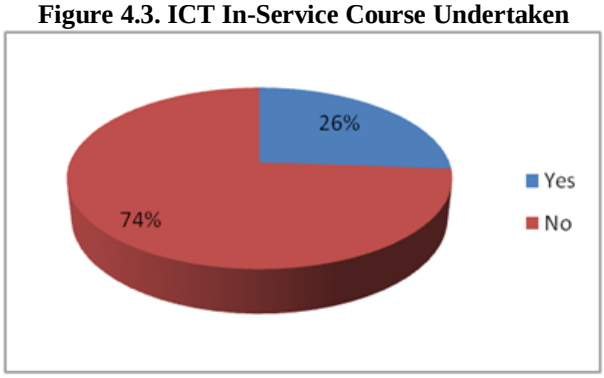
Training plays an important role in teachers' use of ICT. The researcher sought to find out the highest level of ICT training in order to establish its effects on the ICT implementation by teachers in public secondary schools.

**Figure 4.2. Teachers' Highest Level of ICT Training**




From the study, 71% of teachers had no training in the use of ICT, 22% of the teachers had trained up to diploma level, while 7% of the teachers had trained up to the undergraduate level.

**Figure 4.3. ICT In-Service Course Undertaken**

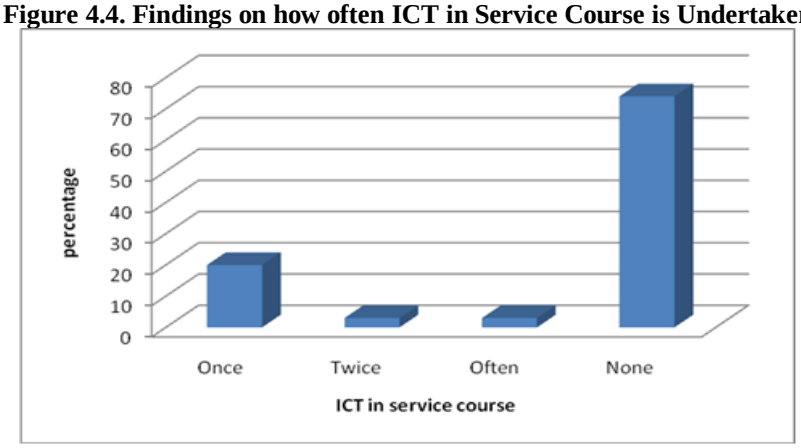



As indicated in the figure 4.3, majority 74 % of the respondents have not taken any form of ICT in-service course while, 26 % of the teachers revealed that they have undertaken some form of ICT in-service course. During the interview schedule conducted with the computer teachers, majority of them argued that in service training has improved ICT implementation in public secondary schools by teachers who have participated in the training while other teachers were of the opinion that ICT training has made teachers to be enlightened on use of ICT to carry out research, prepare notes, schemes of work and examination analysis. This shows that the failure to attend ICT in-service course has negatively influenced its implementation in public secondary schools.

**Findings on how often ICT in service course is undertaken**

The researcher set to find out how often ICT in-service course is undertaken and the findings are as presented in the figure 4.12.

**Figure 4.4. Findings on how often ICT in Service Course is Undertaken**




Majority74 % of the respondents indicated that they have not trained on any form of ICT in service course. The other respondents 20 % said that they have gone for ICT in service training but, only once in a year, 3 % of the respondents indicated that they had gone for the course twice a year and a similar percentage 3 % revealed that they had gone for the course quite often. This shows that majority of the teachers in public secondary schools had not undertaken any form of in- service training which had led to poor implementation of ICT in public secondary schools.

**Teaching experience and use of ICT in examination setting and marks recording**

Use of ICT in examination setting and marks recording

| | Yes | . | No | . |
|---|---|---|---|---|
| Teaching experience | F | % | F | % |
| Below 5 years | 13 | 28 | 6 | 27 |
| 5-10 years | 10 | 21 | 4 | 18 |
| 11 and above | 24 | 51 | 12 | 55 |

Note. N= 69. F = frequency.

Teachers with the teaching experience of 11 years and above use ICT in examination setting and marks recording as indicated by 51 %, on the same level of experience 55 % of the teachers said they do not use it.

Teachers who have taught for less than five years have also used ICT at a lower percentage of 28 % while 27 % of the same teaching do not use it .Teachers who have taught for a period of 5-10 years have the lowest percentage of ICT usage in setting examinations and marks recording as shown by 21 %. From the analysis, teachers with more teaching experience use ICT in setting examinations and marks recording. This could have been prompted by the fact that teachers with higher teaching experience may have gone back to the University for Further Studies and could have been exposed to ICT usage. This indicates an inconsistent relationship between teachers' teaching experience and ICT usage. This is consistent with Zidon and Miller (2002) study which found weak relationship that existed between teaching experience with ICT usage.

**Teaching experience and use of ICT to monitor students' progress**

| | Use of ICT to monitor student progress | | | |
|---|---|---|---|---|
| | | Yes . | No . | |
| Teaching experience | F | % | F | % |
| Below 5 years | 10 | 30 | 9 | 25 |
| 5 – 10 years | 6 | 18 | 8 | 22 |
| 11 and above | 17 | 52 | 19 | 53 |

Note. N= 69. F = frequency.

Teachers with experience of 11yrs and above, 52 % use ICT to monitor student progress and 53 % do not use .For teachers with 5-10 years' experience 18 % use ICT to monitor student progress while 22 % do not use. The findings indicate that the more the teaching experience (5-10 years and 11years and above) the more use of ICT in monitoring students' progress but there is inconsistency for teachers below 5years experience. Rosen and Maguire (1990) concluded that teachers teaching experience does not eliminate computer phobia and many experienced teachers display some discomfort and anxiety in relation to computers.

**Teaching experience and use of ICT in preparing lessons**

| | **Use of ICT in preparing lesson** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Research | | Assessment | | Photocopying | | Not used | |
| Teaching experience | F | % | F | % | F | % | F | % |
| Below 5 years | 6 | 38 | 2 | 50 | 1 | 20 | 10 | 23 |
| 5-10 years | 4 | 24 | 0 | 0 | 0 | 0 | 10 | 23 |
| 11 and above | 6 | 38 | 2 | 50 | 4 | 80 | 24 | 54 |

Note. N= 69. F = frequency.

From the table above it is notable that teachers who have experienced five years of teaching and below, and teachers with 11 and above years of teaching experience use ICT more in carrying out research as indicated by a percentage of 38 %. The same scenario applies to use of ICT in assessment as recorded by 50% in both teaching experiences. Whereas 20% of the teachers with less than five years of teaching experience use ICT in photocopying examination materials, 80% of the teachers who have teaching experience of 11 years and above use ICT for photocopying examination material. 23 % of teachers with experience below 5yrs and between 5-10yrs stated that they do not use ICT in preparing lessons. 24 % of teachers with 5-10 years of experience use ICT in research when preparing lessons.

Teachers with the 5-10 years teaching experience indicate that they do not use ICT for assessment and photocopying examination materials as indicated by 0% while 23 % said they do not use ICT at all in preparing for lessons. This could have been attributed to the fact that teachers who have experience of five years and below were in college when ICT had already been introduced. For teachers who have 11years and above could have gotten the opportunity of going back to the University for further education and hence got exposed to ICT usage. This indicates there is no significant relationship between teaching experience and use of ICT in preparing lessons. This is consistent with Zidon and Miller (2002) who found weak relationship between teachers experience and computer usage**.**

**Teaching experience and forms of ICT used in teaching**

Forms of ICT used in teaching

| | **Laptop** | | **Desktop** | | **Internet** | | **Extranet** | | **Intranet** | | **Projector** | | **None** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Teaching experience | F | % | F | % | f | % | F | % | F | % | F | % | F | % |
| Below 5 years | 4 | 40 | 2 | 29 | 2 | 40 | 1 | 100 | 0 | 0 | 0 | 0 | 10 | 23 |
| 5-10 years | 1 | 10 | 2 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 25 |
| 11 years and above | 5 | 50 | 3 | 42 | 3 | 60 | 0 | 0 | 1 | 100 | 1 | 100 | 23 | 52 |

Note. N = 69. F = frequency.

The table shows that teachers who have 11 years and above of teaching experience have the highest percentage of using laptops (50%) desktop (43 %), internet (60%) and intranet (100.0%) compared to other teachers. Teachers who have five years of teaching experience and below have a lower percentage of using laptop(40 %), desktop (29%), internet (40%) and extranet (100 %). Teachers who have 5-10 years of teaching experience have the lowest percentage in using laptop (10%),desktop (29 %), internet (40.0%), and extranet (100.0%). This could be attributed to the fact that these teachers are more enthusiastic about using the new technology.

**Highest level of ICT training and ICT in-service courses undertaken**

| | Any form of ICT in-service course taken | | | |
|---|---|---|---|---|
| | Yes . | | No . | |
| Highest level of training | F | % | F | % |
| Diploma | 4 | 22 | 11 | 22 |
| Undergraduate | 0 | 0 | 5 | 10 |
| None | 14 | 78 | 35 | 68 |

Note. N = 69. F = frequency.

The table shows that the diploma teachers have higher percentage of 22 % whereas graduate teachers have not, as indicated by 0%. This could be because most ICT courses were initially offered up to diploma level in higher institutions of learning in Kenya. It is recently that ICT courses have been introduced at degree and masters level for example Computer science, information technology among others. This indicates that there is relationship between ICT training and its usage. This is consistent with studies done which found out that with regard to having attended formal computer courses there is significant relationship between usage of computers and computer training (Wong et al, 2002; Sia, 2000).

**Highest level of ICT training and the frequency of ICT in service training**

| | **How often ICT in service course is undertaken** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Once a year | | twice a year | | Quite often | | Not taken | |
| Highest level of ICT training | F | % | F | % | F | % | F | % |
| Diploma | 2 | 14 | 0 | 0 | 1 | 50 | 12 | 23 |
| Undergraduate | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 10 |
| None | 12 | 86 | 2 | 100 | 1 | 50 | 34 | 67 |

Note. N = 69. F = frequency**.**

The table indicates that the diploma teachers have had some form of ICT training often as indicated by14 % and 50.0%. The degree teachers have not had in-service courses in ICT. The reason behind this could be because the schools are the ones which are supposed to fund the teachers going for in-service training and most of the time schools lack the funds to do so.

## IV. Conclusion And Recommendation

Teachers appear to have little understanding of the range of the uses of ICT in school (William et al 2000). The Ministry of Education Science and Technology needs to improve the learning and teaching materials. Teachers need to be trained on how to integrate ICT in their teaching while pursuing their course. Mechanisms should also be put in place where teacher should practice on how to integrate ICT in teaching while on teaching practice. According to what was found out by the above mentioned researchers, ICT is a useful tool for both teachers and students. Through supervision, challenges of implementing ICT in secondary schools can be identified pointing towards a need to up-date or revise the existing problem.

Findings from the reviewed literature showed that very minimal supervision if any is done in Kenya, the Ministry of Education Science and Technology though has given out some computers to secondary schools; there is laxity in supervision so follow-ups should be encouraged. Supervision is also a vital aspect in effective implementation of program if well carried out, as it is likely to improve teachers' and student's literacy in ICT, strategies of teaching and learning.

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