



## THE INTERPLAY BETWEEN THE GRADE THREE TEACHERS' ICT RELATED TRAINING INFLUENCES AND THEIR USE OF ICT IN TEACHING IN GRADE THREE IN NAIROBI COUNTY KENYA

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### Abstract:

This study aimed to establish the interplay between the ICT-related training influences of Grade Three teachers and their use of ICT in teaching in Grade Three in Nairobi County, Kenya. This study was guided by the Technology Acceptance Model, which believes that individuals are objective while developing tasks. However, constraints unconsciously limit the individual's ability to perform the task. The specific objectives of the study were to find out the extent to which Grade Three teachers' ICT related trainings influences the use of ICT in teaching Grade Three learners, to find out the extent to which Grade Three teachers ICT related training influences active involvement of Grade Three learners in ICT related experiences and to determine the challenges faced by Grade Three teachers in using ICT to teach in Public and Private schools. The study used a qualitative research design with a random sample of 34 Grade Three teachers who were selected from 110 public and private primary schools in Kasarani Sub-County, Nairobi County, Kenya. Data was collected using questionnaires administered to Grade Three teachers, interview schedules where Grade Three teachers were interviewed, and an observation checklist where Grade Three teachers and learners were observed during an ICT integrated lesson. Quantitative data were summarized into descriptive statistics such as frequencies and percentages, while a thematic approach analysed qualitative data. Results revealed that the correlation between teachers' ICT training and teachers' use of ICT in classroom teaching was positive but not statistically significant ( $r = .288$ ,  $p = .123$ ).

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Similarly, a positive correlation was observed between teachers' level of ICT training and teachers' use of ICT in classroom teaching, with a coefficient of .448\* and a significance level of .013. Moreover, the positive correlation between teachers' level of ICT training and their use of ICT in classroom teaching suggests that highly trained teachers may find it easy to implement ICT in their teaching. Mobile phones emerge as the most frequently utilized ICT tool, with 33.3% of teachers reporting its most frequent use, followed closely by desktop computers, which are favoured by 36.7% of teachers for frequent use. The study concluded that teachers' usage of ICT in classrooms remains relatively frequent, indicating a moderate level of integration of technology in teaching practices. The study recommended that educational authorities in Nairobi County should design and implement targeted professional development programs aimed at enhancing Grade Three teachers' ICT competencies. Kenya Institute of Curriculum Development (KICED) should develop and implement comprehensive ICT training programs for Grade Three teachers in Nairobi County, Kenya, focusing on technical skills and pedagogical strategies for effective ICT integration in teaching.

**Keywords:** grade three teachers, ICT-related training, grade three learners, ICT-related experiences

## 1. Introduction

ICT refers to the technologies that are used to collect information, store information, edit information, or transmit information in various forms. The use of ICT can change the way we live, work and learn. Living in a digital era, Information Communication Technology (ICT) plays an important role in the modern society day to day life and also in the education system. ICT has become a major part of most aspects of people's lives, including early learners and plays an important role in education. In order to satisfy the demand of a knowledge-based economy, it is important that school leavers be digitally literate. Consequently, schools from as early as preschool in developed countries are investing heavily in digital literacy as a possible solution to teaching in pre-school. According to Gialamas and Nikolopoulou (2010), providing learning resources and tools such as print media and audio-visual resources offer a wide variety of teaching resources to children, and they can be re used in the teaching and learning process. The use of ICT in classroom learning is critical in providing the opportunity for teachers and learners to continually use technology even out of the classroom setting. Using ICT in teaching helps teachers to interact better with learners, and teachers are able to manage their classrooms, hence developing professionally. The ICT skills are conceptualized as the integrated and functional use of digital knowledge, skills and attitudes relating to the technical use of ICTs.

The use of technology by teachers in the early years of education makes learning a familiar experience for learners. A research done by OECD (2010) has shown that when teachers use ICT to plan, implement and execute learning activities important to learners

with parental support, children's learning is enhanced Digital technology when used by teachers can also be important for children's future employment and effective participation in the larger society Living in a technological dominated society, schools might be among the best places where digital technology can be effectively used because of the varied family backgrounds and cultures from learners. Positive attitudes from teachers on technology, such as learning with children as well as learning from children can help to improve how they facilitate learning by use of technology. Teachers' competence in the use of ICT in schools may have a bearing that would help understand the use of ICT in schools. According to Kirschner *et al.* (2009), ICT teacher training is still a challenge for teachers despite competent teaching staff being required to facilitate learning through technology. Therefore, the ICT skills of teachers should be established as one of the reference points for teacher training programs. The concept of digital competence among teachers has also emerged referring to skills, attitudes and knowledge required by facilitators to support children's learning in today's digital world. Practical proposals have also been applied to teacher training, for instance the TPACK model that considers that only teachers who can effectively activate a type of knowledge of disciplinary, pedagogical and technological will be competent. A model of consecutive phases that includes basic ICT skills, didactic ICT competence, learning strategies and proper integration of the previous phases can result in digital teaching competence if utilized effectively.

Integrating ICT in the early years is significant to support children's learning. A study conducted by Fathi & Fatima (2018) aimed towards improving teacher practices regarding to the integration of ICT into early years settings. In the findings, there was evidence that ICT has the potential to support children's early learning when used effectively, intentionally and appropriately. This study also reported that after the introduction of the ICT training programme, the perceptions and practices of teachers had increased, and teachers became more aware of the value and applications of the different ICT tools used in children's learning as compared to outcomes before the integration of the ICT training programmes. To integrate ICT effectively into schools, there is a need for teachers to utilise ICT related tools to support learners during the process of learning. ICT can be integrated into education through the use of electronic devices such as tablets, laptops, Personal Computers (PC's), radios, mobile phones and portable computers. There is a need for teachers to be equipped through training on how effectively they can use electronic devices during lessons to support learning. ICT integration in classrooms can increase learners' engagement during lessons.

The government of Kenya in 2006, disseminated the National ICT Policy on education emphasizing that the Government of Kenya will encourage the use of ICT in schools through promoting affordable ICT infrastructure systems in schools, creating awareness of opportunities offered by ICT promoting the development of local content to address the needs of individual schools, providing an enabling environment for integrating curriculum to support ICT in schools, establishing a national ICT centre of excellence to act as points of reference, facilitating sharing of ICT among schools,

promoting Public- Private training of teachers and school managers and facilitating rural electrification and connecting schools to electricity grid to support ICT. This is a clear indication that the Government of Kenya is committed to investing in the relevant infrastructure that will embrace the use of ICT in schools. A study conducted by Ntorukiri *et al.* (2021) on the impact of integrating ICT infrastructure in teaching and learning in Kenyan secondary schools in Meru County found that only 50% of the schools used computers for teaching and learning, while the remaining 50% used computers for official and administrative purposes only. This study further reported some of the challenges that teachers faced while using ICT in teaching and learning, including power outages, poor storage of ICT materials, lack of enough ICT gadgets, breakdown of ICT materials and challenges in the maintenance and servicing of the ICT gadgets.

Musungu *et al.* (2021), in their study that evaluated the implementation of ICT policy for the education sector in public schools in Kimilili Sub County, reported that teachers were not fully prepared through training to prepare them with the skills and knowledge to utilize ICT. Studies have reported that many teachers have had mixed perceptions towards the integration of ICT into educational practice. One of the obstacles that has been reported in teachers' efforts to use ICT is lack of ICT related training that affect many teachers. Despite the availability of resources in a good number of schools and the GOK's efforts to supply some ICT tools, minimal use of ICT continues to be reported, and many schools in the country are not effectively adopting and using ICT in teaching as intended. This is of great concern, especially with the CBC dispensation that demands the development of digital literacy from the early years of education. Consequently, Studies conducted in Kenya have not yet focused on the extent of use of ICT by teachers with ICT related training vis-a-vis those without such training. At the same time, there is limited knowledge on the challenges private school ECD teachers are facing, with more studies focusing more on challenges faced by public school teachers, hence the need to do further. Furthermore, most of the studies on ICT learning have mainly been done in public secondary schools, which presents a knowledge gap on ICT teaching and learning in primary schools and especially in Grade Three Teachers in Nairobi County, Kenya.

## **1.2 Purpose of the Study**

To find out the extent to which Grade Three teachers' ICT-related training influences their use of ICT in teaching in Grade Three in Nairobi County, Kenya.

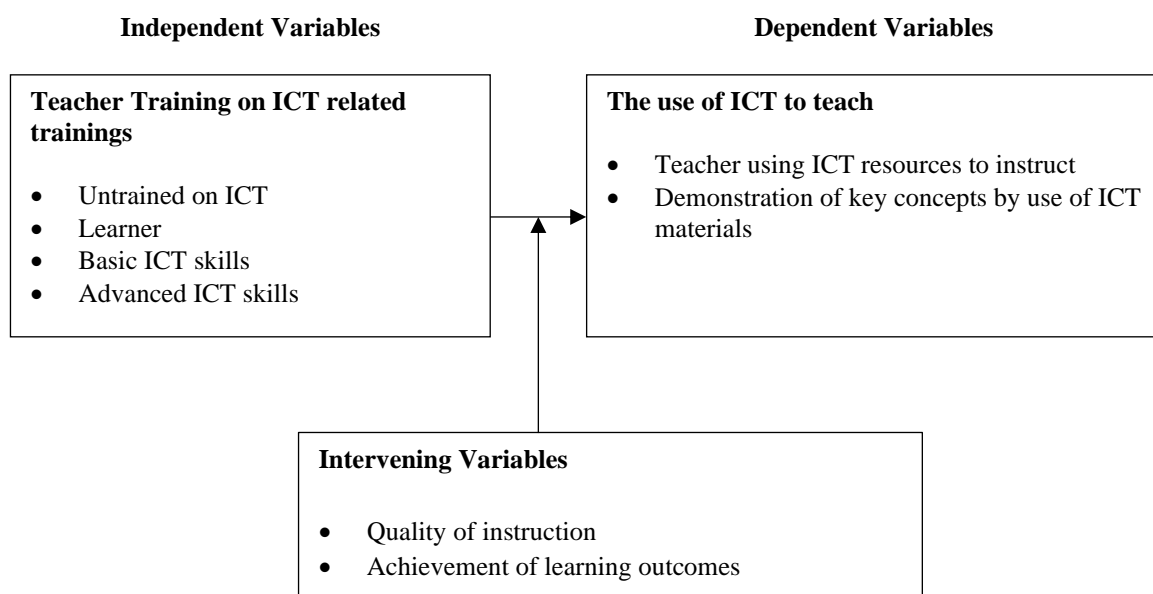
## **1.3 Theoretical Framework**

The theoretical foundation of this study is the Technology Acceptance Model (TAM) that evolved from the Theory of Reasoned Action (TRA). Theory of Reasoned Action and Technology Acceptance Model are both based on beliefs that when an individual is objective in developing a task to perform, the individual is considered free to execute the task without any limitations, however some constraints such as environmental constraints, organizational constraints, imperfect skills and restricted time might

unconsciously limit an individual's ability to undertake the action. The Technology Acceptance Model is considered the most persuasive and most pragmatic theory for describing an individual's acceptance to new technological systems. The Technology Acceptance Model is used to predict the intention of an individual(s) to use information systems based on the perceived usefulness of the information system and the ease of use of the information system. This theory employs three steps during the process.

Behavioural intention to use a technology leads to the actual use of the technology by the individual. It is interesting to note that the behavioural intention towards using information systems is influenced more by the perceived usefulness of information systems variable compared to the perceived ease of use variable. The behavioural intention towards information systems use enables users to actively make a decision out of willingness to use the information system that primes to the actual use of the information system. A teacher whose behavioural intention towards integrating ICT in learning is more likely to use ICT related teaching methods of teaching instruction. This study adopted Fred Davies's Technology Acceptance Model since it evidently brings out the general determinants towards individual acceptance towards using computer systems and explains a broad range of behaviour intention in both voluntary and mandatory environments. It also sheds more on the various aspects that new technology is acknowledged and used by the user. The Technology Acceptance Model can also be referred to when predicting the acceptability of new information systems as well as identifying adjustments that can be put into place to make a new system more acceptable to users.

### 1.6 Conceptual Framework



**Figure 1: Conceptual Framework**

## 2. Literature Review

### 2.1 Teachers' Training and Preparation in the Use of ICT

According to Buabeng (2019), many learning institutions and governments around the world have integrated ICT in teaching and learning, with major priorities placed on its integration and implementation. Teachers' knowledge and skills in the use of technology have had a great impact on the way in which they apply technology during the teaching and learning process. According to Bindu (2016), teachers in this technological era should not only be conversant with the content they intend to teach but also be able to effectively deliver the content they intend to teach through the integration of technology. According to Kilag and Sasan (2023) teacher professional development (TPD) is important in the enhancement of the quality of teaching as teachers gear towards adapting to their new profession reality. Teacher professional development can be conducted through workshops, enrolling in formal ICT-related courses, or peer learning among teachers. An OECD TALIS survey in Spain reported that almost two-thirds of teachers needed more professional training on the use of ICT in classrooms. A policy on digital competencies for teachers has been a priority for many European countries with the development of the European Framework for the digital competencies of educators (DigCompEdu). This policy is directed towards teachers at all levels of education, i.e., from early childhood education to higher education with inclusions to special needs education as well as vocational training education.

According to the United Nations sustainable development goal number four it aims at ensuring inclusive, equitable and quality education to promote lifelong learning and opportunities for all in developing countries. This has also been supported by the UNESCO education for all, which calls for the understanding of educational quality through a holistic approach that considers factors among which quality of teachers is a key indicator of the quality of education. To achieve the sustainable development goal four, there is a need to increase access to qualified teachers, especially in the developing countries. The use of ICT in education promotes quality education, access to learning opportunities, and lifelong learning. A study by the Education Audio-visual and Culture Executive Agency (2019) calls for the integration of ICT in education through focusing on capacity building of teachers because teachers require a set of skills to enhance learners' learning environments as well as manage the classroom effectively. Teachers can be of support to learners' use of ICT by embracing digital learning through using ICT, for instance using compact disks (CD) to record video materials for learners to interact with. Danaher (2010) studied teacher education through open and distance learning found that teachers were gaining more interest in using ICT to teach, aggregate discussions, synthesis and analyse various educational topics through using of applications such as blogs and podcasts which shows that Information and Communication Technology is a popular tool that can be utilized to support teachers in their professional development. Although considerable literature has been reviewed on the teacher trainings of preparations in the use of ICT in teaching, one may note that there is still lack of

satisfactory literature specifically on the ICT related courses that teachers have been trained on, that should equip teachers better towards translating their acquired knowledge of using the ICT skills in teaching of learners in classrooms. The literature reviewed also lacks recent studies that reflect on how teacher training on ICT-related courses has influenced teachers' preparations towards lessons and the adoption of ICT-related medium of instruction during the process of teaching and learning.

### **3. Research Methodology**

#### **3.1 Location of the Study**

Nairobi County was purposely selected for this study for two reasons. First, Muriithi and Yoo (2021) reported that teachers in Nairobi County were observed to have high attitudes towards the use of ICT resources irrespective of their gender. Secondly, this county is Kenya's capital city, capable of mobilizing many resources and well-equipped primary schools established as model centres. Therefore, it is anticipated that more primary schools in the County have been better positioned regarding ICT resources. This, therefore, impelled the researcher to conduct this study in Nairobi City County of Kenya.

#### **3.2 Research Design**

This study made use of a qualitative research design. The qualitative research design was applicable to this study because of its descriptive nature and ability to examine issues in depth. Qualitative research design is popularly known for its ability to explain data and reveal contexts that numbers alone are unable to expose. Since the variables do not need to be manipulated, this research design assisted the researcher in establishing the relationship between teachers' training on ICT-related courses and the use of ICT to teach learners.

#### **3.3 Target Population**

The target population for this study is Grade three pupils. Grade three pupils were targeted because this is a level in early childhood education where learners are developmentally mature and can be able to manipulate most of the ICT gadgets with more independence. Therefore, it is possible to observe them using ICT materials in the learning process. Further, according to a survey conducted by UWEZO (2020), it was reported that in general, more than 50% of learners who are in Grade Three in Kenya are of the appropriate age for the Grade, that is, 7 years to 9 years.

#### **3.4 Sampling Techniques and Sample Size**

Purposeful sampling was employed to select Nairobi County out of the Forty-Seven counties present in Kenya. Nairobi as a county has 17 sub-counties, and out of the 17 sub-counties, the Kasarani sub-county was randomly selected. Kasarani Sub-County has 368 registered Primary schools. Stratified random sampling was employed to select 30% of the primary schools in the sub-county, which translated to 110 primary schools. The

target population was stratified into two categories, public and private primary schools, which ensured that each stratum was represented. Purposive sampling was employed to select public and private primary schools from each stratum, which formed the population sample for this study. The researcher purposely selected Public and Private schools that were well equipped with ICT resources within Kasarani Sub-county in Nairobi County.

In this study, 30% of the target population was sampled. According to Mugenda and Mugenda (2013), a sample size ranging from 10% to 30% of the targeted population is deemed acceptable for a study. The sample size comprised Thirty-Four Primary schools within Kasarani Sub-county, consisting of eight public primary schools and twenty-six private primary schools. Each primary school was represented by one Grade Three teacher, who participated by completing a questionnaire and engaging in in-depth interviews conducted by the researcher (Table 1).

**Table 1: Sampling Matrix**

Category	Population	Sample size
Number of Public Schools	25	8
Number of Private Schools	85	26
Number of Public-School Teachers	25	8
Number of Private School Teachers	85	26
<b>Total</b>	<b>225</b>	<b>68</b>

### 3.5 Research Instruments

Questionnaires for Grade Three teachers, interview schedules for Grade Three teachers and an observation checklist to observe learners' experiences during ICT integrated lessons were used to collect data. Questionnaires aimed to collect self-reported information from the respondents, specifically Grade Three teachers. Interviews were used to gather additional information beyond what was captured in the questionnaires. An observation checklist was used for data collection to enable the researcher to compare the outcomes with other information collected using alternate data collection methods. Nkembo, Koloseni, & Shimba (2011) agree that observation procedures of data collection allow researchers to gather evidence of the way things are organized and listed.

### 3.6 Pre-testing/Piloting Study

A pilot study was conducted with two teachers in one of the schools in the name sub-county. These teachers and their schools were involved in the main study. All Grade Three class children in the class were observed to establish their level of active engagement during ICT-integrated lessons. The pilot study aided the researcher in familiarizing himself with the research tools and pre-testing them. It also helped to test the language level, as well as identify and correct any ambiguous items in advance before the final data collection process is carried out. The two schools that participated in the pre-test survey were not included in the ultimate research. The reliability of the research instruments was tested using the Pearson coefficient test. For a research instrument to be



deemed valid, the obtained value had to be greater than the critical value in the table. A critical value exceeding 0.5 would nullify the validity of a question as significant. The researcher used the internal consistency reliability method to evaluate the consistency of the questionnaire, Observation checklist and interview items. Pallant (2005) argues that in any research study, it is important to apply scales that are consistent. Cronbach's Alpha coefficient was used to calculate the reliability coefficients correlation on internal items. Values above .70 reveal that the instruments are dependable. Jackson (2009) argues that for the reliability of research items to be considered solid, the values have to be higher than .70.

### **3.7 Data Collection Techniques**

Data collection followed three stages: administering the questionnaires to teachers, collecting completed questionnaires from the teachers, and conducting an observation of learners while the teacher instructed using ICT media. During the initial visits, the researcher met the participants face to face, explained the questionnaire to them, and issued out the questionnaire to each participant individually, allowing them enough time to respond. The researcher collected the filled questionnaires from the respondents and was present to clarify whenever possible. An observation day was scheduled for each of the selected schools, where the researcher attended one Grade Three lesson to observe the Grade Three teacher as well as Grade Three learners during ICT-integrated lessons. The researcher had an observation checklist, which they filled in as they observed learners' level of engagement during the lesson. The researcher filled in the observation checklist during the lesson to avoid errors of omission of observed behaviours.

### **3.8 Data Analysis**

The diverse categories of data were analysed disjointedly, and triangulation of the outcomes was described during the interpretation segment. Quantitative data from questionnaires were sorted, cleaned, and coded first before being entered into the SPSS software version 22.0. The accuracy of the data entry was confirmed by checking for any missing data and scrutinizing the minimum and maximum value for each variable to ensure that any value did not exceed the scale for its measurement. Descriptive statistics from the demographic section were calculated, and the descriptive statistics were summarized by the use of percentages as well as frequencies. Qualitative data were analysed thematically. Transcribing documented interviews was done by listening to the audios and transcribing word for word.

### **3.9 Ethical Considerations**

Participants who, for any reason, desired to withdraw from the study were allowed to do so without any penalties or consequences. However, the researcher made a follow-up plan to understand the purpose of their withdrawal from the study. The researcher assured the participants of their confidentiality. Information filled out by participants was sealed; individual details such as names and mobile numbers were not mentioned

in the research study, while coding of participants happened to safeguard their information. The consent of all participants to the study was sought before the data collection process began. All the information contained in the consent was well explained to the participants, and participants who gave their consent to participate in the research study were the only ones who were involved in the research study.

## 4. Findings and Discussions

### 4.1 Demographic Information

The demographic characteristics of the participants were analysed and discussed in terms of gender and highest level of education. The data is presented in Table 2.

**Table 2:** Demographic Information of the Teachers vs School Type

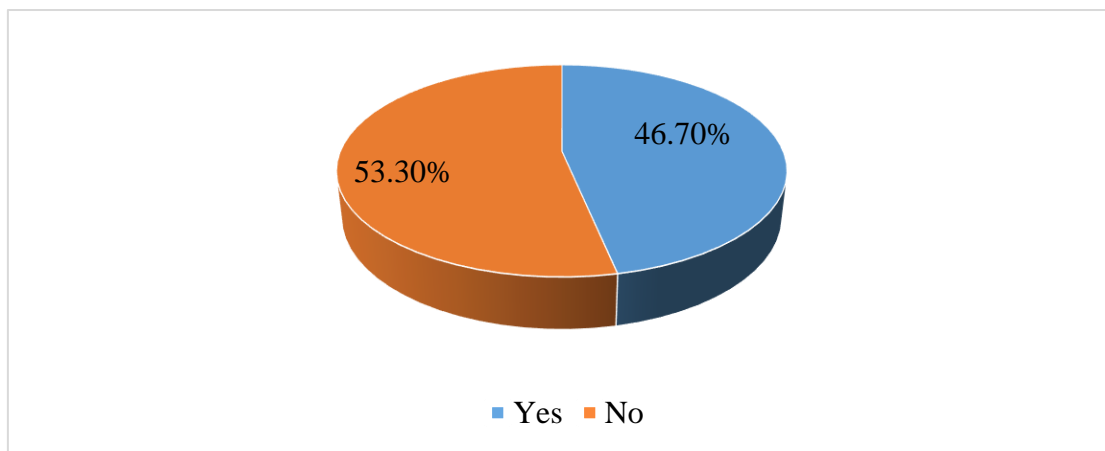
Demographic information		Type of Primary School			
		Public		Private	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Distribution of Teachers by Gender	Male	2	33.3	15	62.5
	Female	4	66.7	9	37.5
	<b>Total</b>	<b>6</b>	<b>100.0</b>	<b>24</b>	<b>100.0</b>
Highest Academic Qualification of Teachers	P1 Certificate	3	50.0	6	25.0
	Diploma ECD	2	33.3	8	33.3
	Diploma in PTE	1	16.7	7	29.2
	Bachelors	0	0.0	2	8.3
	Masters & PHD	0	0.0	1	4.2
	<b>Total</b>	<b>6</b>	<b>100.0</b>	<b>24</b>	<b>100.0</b>

The provided demographic information, as shown in Table 4.2, presents the characteristics of Grade Three teachers participating in the study, categorized by gender and highest level of education. In public schools, two out of six teachers (33.3%) are male, while four out of six teachers (66.7%) are female. In private schools, 15 out of 24 teachers (62.5%) are male, and nine out of 24 teachers (37.5%) are female. In public schools, the highest academic qualification varies, with the majority holding P1 certificates (50%), followed by Diploma in ECD (33.3%) and Diploma in PTE (16.7%). In private schools, the distribution of highest academic qualifications is more diverse. While the largest proportion still holds P1 certificates (25%), a significant number have Diplomas in ECD (33.3%) and Diploma in PTE (29.2%). Additionally, there are a few teachers with Bachelor's degrees (8.3%) and even one with a Master's or PhD (4.2%). The higher proportion of male teachers in private schools compared to public schools may reflect different hiring practices or preferences among private institutions. This gender disparity could influence the dynamics of ICT-related training and usage, as male and female teachers may have different levels of exposure or comfort with technology, potentially impacting their implementation of ICT in teaching. The variation in academic qualifications among Grade Three teachers suggests differences in educational background and training experiences. Teachers with higher qualifications, such as

Bachelor's or Master's degrees, may have received more extensive training in ICT integration during their studies, potentially influencing their ability to utilize ICT in teaching. However, it's essential to note that qualifications alone do not necessarily correlate with ICT proficiency or willingness to adopt technology in the classroom.

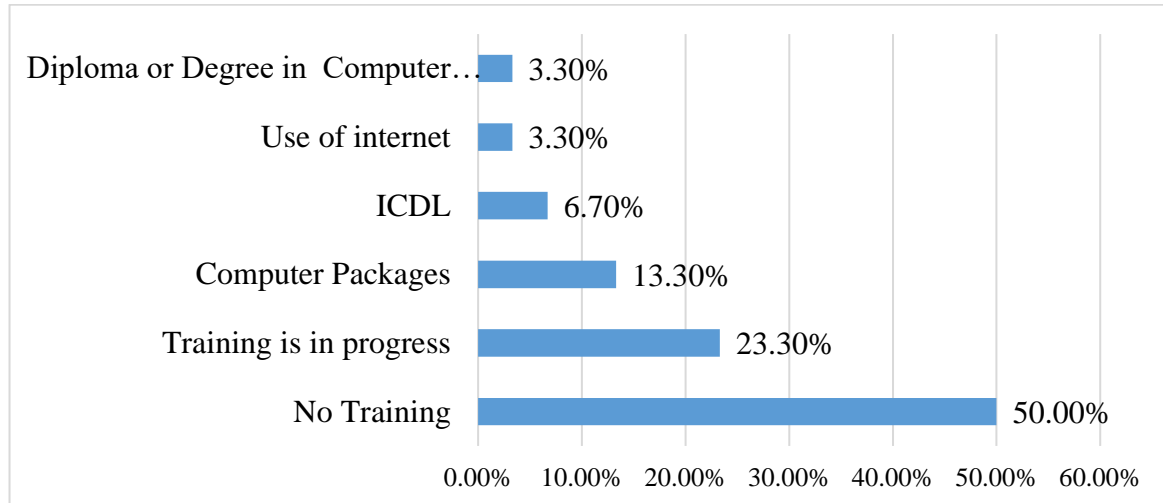
#### 4.2 Teacher's Training and Usage of ICT in Teaching Grade Three Learners

The first objective of the study was to find out the extent to which Grade Three teachers' ICT-related training influences their use of ICT in teaching in Grade Three in Nairobi County, Kenya. To accomplish this, teachers were asked to state whether they were trained in any ICT related course and their level of ICT Training. Findings are presented in Figure 2.



**Figure 2:** Teachers' Training in ICT

Figure 2 presents data on Grade Three teachers' training in ICT-related courses. Out of the total participants, 14(46.7%) reported being trained in ICT, while the remaining 16(53.3%) indicated no such training. This suggests a moderate level of ICT training among Grade Three teachers in Nairobi County. The findings regarding teachers' ICT training align with those of Buabeng (2019) which emphasized the importance of teacher preparation in ICT for effective integration into teaching practices. Relatively, Bindu (2016) also noted that teachers should possess both content knowledge and technological skills to facilitate learning through ICT. However, the proportion of teachers reporting no ICT training indicates a gap that needs to be addressed through professional development initiatives.



**Figure 3:** Teachers' Training in ICT

Figure 3 presents the level of ICT training among Grade Three teachers. The majority 15(50.0%) reported being untrained in ICT, while 7(23.3%) indicated that their training was in progress. Only a small percentage reported having diplomas or degrees in computer-related fields. This highlights variations in ICT proficiency among Grade Three teachers, with a significant portion still in need of training. The findings align with those of Kilag and Sasan (2023) which indicated that teacher professional development enhanced teaching quality. This implies that the presence of ongoing training indicates efforts to improve ICT competence among teachers, which is crucial for effective integration into teaching practices. However, the limited number of teachers with advanced degrees in computer-related fields underscores the need for comprehensive training programs to address the diverse ICT needs of Grade Three teachers.

#### 4.2.1 Teacher's Competence Level in Basic ICT Skills

Further, the study sought to establish teachers' knowledge and competence in ICT tools. Teachers were asked to indicate the ICT areas that they were knowledgeable in against the respective ICT tool given in a table by selecting their most appropriate answer based on a scale of 1 – 3 (Not competent=1, competent=2 and very competent=3). The results were as presented in Tables 4.3 (for basic ICT skills) and 4.4 (for advanced ICT skills).

**Table 3: Teacher's Competence Level in Basic ICT skills**

ICT Tool vs Teacher's Competence	Frequency	Percentage (%)
Use of Microsoft Word	Not Competent	4 13.3
	Competent	22 73.3
	Very Competent.	4 13.3
	<b>Total</b>	<b>30</b> <b>100.0</b>
Use of Microsoft Excel	Not Competent	5 16.7
	Competent	18 60.0
	Very Competent	7 23.3
	<b>Total</b>	<b>30</b> <b>100.0</b>
Preparing PowerPoint presentations	Not Competent	3 10.0
	Competent	18 60.0
	Very Competent	9 30.0
	<b>Total</b>	<b>30</b> <b>100.0</b>
Presenting using PowerPoint	Not Competent	4 13.3
	Competent	18 60.0
	Very Competent	8 26.7
	<b>Total</b>	<b>30</b> <b>100.0</b>
Use of Internet e.g. using search engines such as Google	Not Competent	4 13.3%
	Competent	17 56.7%
	Very Competent	9 30.0%
	<b>Total</b>	<b>30</b> <b>100.0</b>
Use of email	Not Competent	3 10.0
	Competent	22 73.3
	Very Competent	5 16.7
	<b>Total</b>	<b>30</b> <b>100.0</b>
Use of social media (e.g. Facebook or what Sapp or Pinterest, or TikTok)	Not Competent	4 13.3
	Competent	18 60.0
	Very Competent	8 26.7
	<b>Total</b>	<b>30</b> <b>100.0</b>

Table 3 presents Grade Three teachers' self-reported competence levels in basic ICT skills. The majority reported being competent in skills such as using Microsoft Word (73.3%), Excel (60.0%), and PowerPoint (60.0%), as well as basic internet skills (56.7%). However, competence levels varied across different ICT tools. The findings are consistent with those of Meirovitz *et al.* (2022), which showed that basic ICT skills are crucial for teachers' effective use of technology in classrooms. High competence levels in basic skills suggest a foundation for integrating ICT into teaching practices. However, disparities in competence levels across different ICT tools indicate the need for targeted training to address specific skill gaps among Grade Three teachers.

**Table 4: Teacher's Competence Level in Advanced ICT skills**

ICT Tool vs Teacher's Competence		Frequency	Percentage (%)
	Competent	22	73.3
	Very Competent	5	16.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Use of social media (e.g. Facebook or Whatsapp or Pinterest, or TikTok)	Not Competent	4	13.3
	Competent	18	60.0
	Very Competent	8	26.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Taking videos	Not Competent	6	20.0
	Competent	23	76.7
	Very Competent	1	3.3
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Displaying videos	Not Competent	9	30.0
	Competent	19	63.3
	Very Competent	2	6.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>
YouTube	Not Competent	7	23.3
	Competent	19	63.3
	Very Competent	4	13.3
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Setting video conferences	Not Competent	8	26.7
	Competent	18	60.0
	Very Competent	4	13.3
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Writing blogs	Not Competent	10	33.3
	Competent	17	56.7
	Very Competent	3	10.0
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Learning management systems	Not Competent	9	30.0
	Competent	19	63.3
	Very Competent	2	6.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Accessing or downloading KNEC Assessments from KNEC portal	Not Competent	11	36.7
	Competent	16	53.3
	Very Competent	3	10.0
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Accessing KNEC Assessments Results from KNEC portal	Not Competent	8	26.7
	Competent	20	66.7
	Very Competent.	2	6.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Uploading pupils details on NEMIS portal	Not Competent	8	26.7
	Competent	20	66.7
	Very Competent	2	6.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>
Scheduling Zoom (setting up) or Google Meet meetings	Not Competent	8	26.7
	Competent	20	66.7
	Very Competent	2	6.7
	<b>Total</b>	<b>30</b>	<b>100.0</b>

Managing online (Zoom or Google Meet) meetings	Not Competent	7	23.3
	Competent	20	66.7
	Very Competent	3	10.0
	<b>Total</b>	<b>30</b>	<b>100.0</b>

Table 4 presents Grade Three teachers' self-reported competence levels in advanced ICT skills. While most reported competence in some advanced skills, such as accessing KNEC assessments (53.3%) and managing online meetings (66.7%), others indicated lower proficiency levels in areas like writing blogs and setting video conferences. The findings reflect the diverse nature of ICT skills required for effective teaching practices. These findings corroborate those of Wambiri and Ndani (2016), who showed that teachers' competence in advanced ICT skills is essential for leveraging technology to enhance learning experiences. However, skill gaps highlight the need for ongoing professional development to ensure teachers are equipped with the necessary competencies for ICT integration.

Teachers were asked to state how often they used ICT in classrooms, as shown in Figure 4.

**Figure 4: Frequency of ICT usage by Teachers in Classrooms**

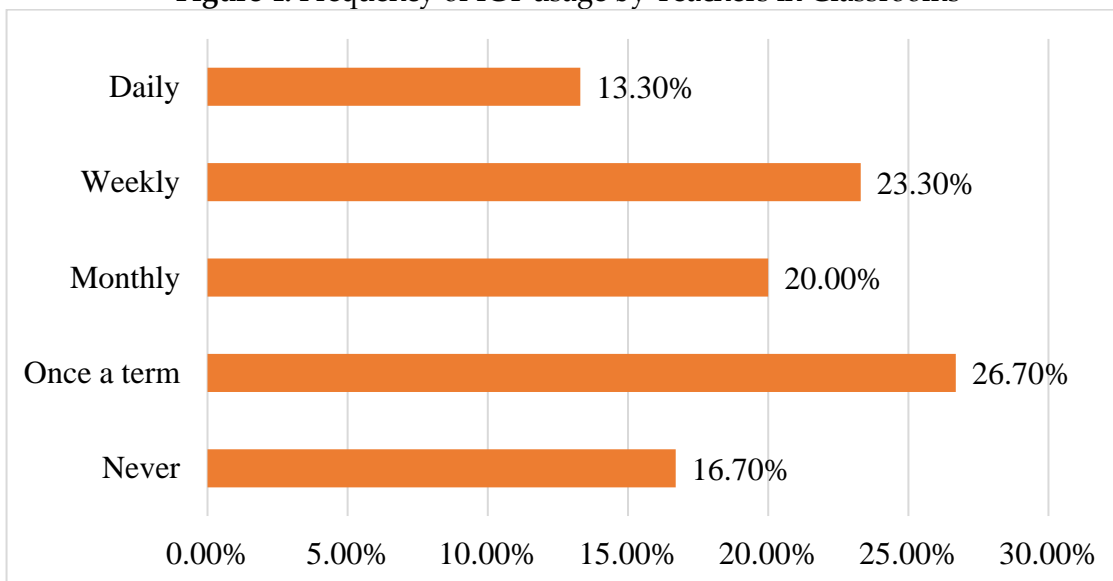


Figure 4 illustrates the frequency of ICT usage by Grade Three teachers in classrooms. While a significant percentage reported using ICT weekly or daily, others indicated infrequent usage or never using ICT in their classrooms. The findings underscore the importance of regular ICT usage in classrooms to enhance teaching and learning experiences. Teachers' willingness to integrate ICT into their teaching practices aligns with the goal of promoting quality education and lifelong learning as per the UN Sustainable Development Goal 4. However, efforts are needed to address barriers to ICT usage and promote more consistent integration across classrooms.

Using an interview guide, teachers were asked to give the ICT tool(s) they preferred using during lessons. One of the participants remarked;

*"I find myself using interactive whiteboards more often than other ICT tools because they offer a dynamic way to present information and engage students. With interactive whiteboards, I can incorporate multimedia elements such as videos, images, and interactive activities, which captivate students' attention and make the learning experience more interactive and stimulating."* (Private school teacher, Female)

The above sentiment was supported by another participant who added that;

*"I prefer using the interactive whiteboard during lessons because it allows for interactive learning experiences and visual aids, which are beneficial for student engagement. The interactive features enable students to actively participate in the lesson through touch-screen interactions, annotation, and collaborative activities, fostering a more dynamic and immersive learning environment."* (Public school teacher, Female)

Teachers acknowledged that even though they had no advanced training in ICT, they could manage to use various ICT tools due to exposure to ICT gadgets and digitized gadgets. One of the teachers elaborated;

*"My ICT skills are fairly advanced, which allows me to explore various digital resources and platforms to enhance my teaching methods. I am proficient in using educational software, online learning platforms, and digital collaboration tools, enabling me to create innovative lesson plans and provide differentiated instruction tailored to students' needs."* (Public school teacher, male).

#### **4.2.2 Correlation between Teacher's ICT Training and Usage of ICT in Teaching**

A Pearson correlation test was used to measure the strength and direction of the relationship between teachers' ICT training and usage of ICT in teaching. The correlation coefficient, often denoted by  $r$ , quantifies the degree to which changes in one variable are associated with changes in another variable, as demonstrated in Table 5.



**Table 5: Pearson's Correlations Test: ICT training and ICT use in Classrooms**

Item		Teacher's ICT training	Teacher's level of ICT training	Teacher's use of ICT in classroom teaching
Teacher's ICT training	Pearson Correlation	1	-.761**	.288
	Sig. (2-tailed)		.000	.123
	Sum of Squares and Cross-products	7.467	-15.000	5.600
	Covariance	.257	-.517	.193
	N	30	30	30
Teacher's level of ICT training	Pearson Correlation	-.761**	1	.448*
	Sig. (2-tailed)	.000		.013
	Sum of Squares and Cross-products	-15.000	52.000	-23.000
	Covariance	-.517	1.793	-.793
	N	30	30	30
Teacher's use of ICT in classroom teaching	Pearson Correlation	.288	-.448*	1
	Sig. (2-tailed)	.123	.013	
	Sum of Squares and Cross-products	5.600	-23.000	50.700
	Covariance	.193	-.793	1.748
	N	30	30	30
**. Correlation is significant at the 0.01 level (2-tailed).				
*. Correlation is significant at the 0.05 level (2-tailed).				

Table 5 presents the results of a Pearson correlation test examining the relationship between teacher ICT training, level of ICT training, and their use of ICT in classroom teaching. The correlation between teachers' ICT training and teachers' use of ICT in classroom teaching was positive but not statistically significant ( $r = .288$ ,  $p = .123$ ). Similarly, a positive correlation was observed between teachers' level of ICT training and teachers' use of ICT in classroom teaching, with a coefficient of  $.448^*$  and a significance level of  $.013$ . Moreover, the positive correlation between teachers' level of ICT training and their use of ICT in classroom teaching suggests that highly trained teachers may find it easy to implement ICT in their teaching. In support of the study findings, UNESCO (2019) emphasized that those without training may face challenges and barriers in implementing digital systems in teaching. This underscores the need for supportive environments and ongoing support mechanisms to facilitate successful ICT integration.

#### 4.3.2 Bayesian Regression

Bayesian regression was conducted to make predictions by simulating from the posterior predictive distribution. Table 4.6 presents the data for ANOVA.

**Table 6:** ANOVA Table

ANOVA <sup>a,b</sup>					
Source	Sum of Squares	Df	Mean Square	F	Sig.
Regression	4.200	1	4.200	2.529	.123
Residual	46.500	28	1.661		
Total	50.700	29			
a. Dependent Variable: Frequency of ICT in classrooms					
b. Model: (Intercept), Training in ICT related course?					

Table 6 presents the results of Bayesian regression analysis examining the relationship between the frequencies of ICT usage in classrooms and training in ICT-related courses. The regression model yielded a significant F-value of 2.529 ( $p = .123$ ), indicating that the model is statistically significant. The coefficient for the regression term (Training in ICT-related course) was 4.200, indicating a positive relationship between training in ICT and the frequency of ICT usage in classrooms. However, the residual mean square value was 1.661, suggesting variability in the data that is not accounted for by the regression model. The significant F-value suggests that the regression model explains a proportion of the variance in the frequency of ICT usage in classrooms. This finding is supported by Buanbeng (2019), who noted that teacher training in ICT-related courses may influence their propensity to use ICT in teaching. Nevertheless, the presence of variability in the data not accounted for by the model suggests that other factors beyond ICT training may also impact the frequency of ICT usage in classrooms. This could include factors such as infrastructure availability, pedagogical beliefs, and institutional support. Therefore, while ICT training is important, a multifaceted approach that addresses various contextual factors is necessary to promote effective ICT integration in teaching practices.

## 5. Conclusion

The findings of this study highlight the complex relationship between Grade Three teachers' ICT-related training and their usage of ICT in teaching in Nairobi County, Kenya. While many teachers demonstrate a willingness to utilize ICT in their classrooms, there are notable variations in their formal training and competence levels. Contrary to expectations, an inverse relationship was observed between teachers' ICT training and their perceived level of training, suggesting the need for further investigation into factors influencing teachers' perceptions of their ICT competence. Despite these challenges, teachers' usage of ICT in classrooms remains relatively frequent, indicating a moderate level of integration of technology in teaching practices.

## 6. Recommendations of the Study

- 1) The Ministry of Education should design and implement targeted professional development programs aimed at enhancing Grade Three teachers' ICT

competencies. These programs should focus on both basic and advanced ICT skills relevant to teaching and learning processes

- 2) The school administration should provide institutional support, including access to ICT resources, technical assistance, and administrative policies, to create an enabling environment for effective ICT integration in Grade Three classrooms.
- 3) There is a need for comprehensive teacher training programs focused on ICT integration in teaching practices. These programs should not only impart technical skills but also emphasize pedagogical strategies for effective ICT utilization.

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### **Conflict of Interest Statement**

The authors declare no conflicts of interest.

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