

**ATTITUDE TOWARDS INFORMATION COMMUNICATIONS
TECHNOLOGY AND INTERVENTIONS AMONG TEACHER TRAINEES IN
PUBLIC PRIMARY TEACHER TRAINING COLLEGES IN MACHAKOS
COUNTY, KENYA**

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DECLARATION

I declare that this project is my original work and has not been presented in any other university or institution for consideration for any certification. This research study has been complemented by referenced sources duly acknowledged. Where text, data (including spoken words) graphics, pictures or tables have been borrowed from other sources, including the internet, these were specifically accredited and references cited using current APA system and in accordance with anti-plagiarism regulations.

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DEDICATION

This project is dedicated to my wife Lydia Kivindu, my children, Kizito Muoki and Fiona Kavata who helped me focus on it by being understanding, patient and encouraging. Glory is to God for his provision and undeserved kindness towards me and my family.

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ABBREVIATIONS AND ACRONYMS

CAS	: Computer Attitude Scale
ICT	: Information Communications Technology
KIE	: Kenya Institute of Education
KPTTC	: Kenya Primary Teachers' Training College
MHEST	: Ministry of Higher Education, Science and Technology
MIC	: Ministry of Information and Communications
MOE	: Ministry of Education
MOEST	: Ministry of Education Science and Technology
NICTSET	: National Information and Communications Technology Strategy on Education and Training
PTE	: Primary Teacher Education
PTTCs	: Primary Teachers' Training Colleges
UNESCO	: United Nations Educational, Cultural and Scientific Organization
UNESCO-IICBA	: United Nations Educational, Cultural and Scientific Organization- International Institute for Capacity Building in Africa

ABSTRACT

Over the past few years, Information and Communication Technology (ICT) has tremendously transformed the ways of teaching and learning. Recently, the Kenyan educational system has increasingly been financing the use of ICT devices into the educational sector. However, the teaching of the ICT subject in teacher colleges neglects students' attitudes towards computers. This study sought to explore the attitude towards Information Communication Technology subject and intervention measures applied among primary school teacher trainees to promote a positive attitude towards ICT in public primary teacher training colleges in Machakos County in Kenya. The study was guided by the following objectives: to determine the proportions of teacher trainees' attitudes towards ICT; to assess the challenges influencing teacher trainees attitudes towards computers; to establish the influence of computer experience on teacher trainees attitudes toward ICT; investigate the influence of specialisation in science or arts on teacher trainees attitudes towards ICT, establish gender differences in trainees' attitude towards ICT and to find out the intervention measures on teacher trainees attitudes towards ICT in public teacher training colleges in Machakos County. This study was guided by B.F. Skinner's operant conditioning theory (1954) and the social learning theory of Albert Bandura (1971). The descriptive survey designed was used for the research. The target population of the study was 400 second year teacher trainees. The investigation used Krejcie & Morgan (1970) formula to select the sample size of 49%. Simple random sampling technique was used to choose five out of the ten second year streams of the college for the study. It was hoped that the results were to be generalized to the entire country, Kenya. The study used a self-administered questionnaire to collect data from teacher trainees and the test-retest approach to determine the reliability of the instrument during piloting. The research tool's Cronbach's alpha was 0.76. The expert approval was used to test the validity of the instruments. The Statistical Package for Social Sciences (SPSS 26) was used to code and input the data, then analyse it using descriptive statistics. The data was presented in tables and in figures. The study found that the majority (93.3%) of the teacher trainees had a positive attitude towards ICT. The majority (74%) of the respondents cited the subject not being examined by the Kenya National Examinations Council as their greatest challenge to learning ICT in teacher training colleges. Results also showed trainees' positive attitudes toward computers were influenced by their duration of computer experience, although gender and their concentration in the sciences or the arts had little bearing on this. For the majority of trainees (88.8%), the primary intervention strategy utilized to foster positive attitudes toward ICT in the college consisted of ICT teachers persistently persuading trainees of the utility of ICT for them. In conclusion, the most significant challenge for the respondents, 74% was discouragement of learning of ICT in teacher Training colleges due to lack of a national examination for the subject. Therefore, this study recommends that, there should be a national examination for the ICT subject to encourage all trainees to learn ICT more seriously than before.

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This chapter provides the background to the study, statement of the problem, purpose of the study, the objectives of the study and research questions. Subsequently, the significance of the study, limitations and delimitations, assumptions, theoretical and conceptual framework and, finally, operational definitions of research terms are discussed.

1.2 Background to the Study

The demand for efficient use of information and communications technology (ICT) in the fields of education and human advancement has increased in the twenty-first century due to rapid globalization. Consequently, the teaching of ICT has been observed in many educational institutions worldwide (Friedman et al., 2010; Ismail et al., 2010). According to Hennessy et al. (2010) governments all over the world including those in Sub-Saharan Africa, Kenya being among them, have stressed the value of teacher development in incorporating ICT into the classroom and improving student achievement.

A number of studies have found a connection between the reasons people utilize or ignore ICT. Their principal correlation lies in an individual's disposition towards computers. There are two possible attitudes toward ICT. One could either hold a positive or negative view of ICT. Sadera & Hargrave (in Fisher, 2011) stated that, researching attitudes toward

ICT and comprehending the factors that influence them is vital for teacher educators hoping to design a successful teacher curriculum that will prepare students to meet the challenges of the information age. The reason for this is that in the information age, Information Communication Technology is essential.

Many studies carried out globally have highlighted the role that attitude plays in supporting ICT learning and using the technology in the classroom. Busch (in Sam et al., 2012) suggested the key components for promoting the development of computer skills and ensuring that people use them in learning. These are: good attitudes toward computers, strong computer self-efficacy and reduced levels of fear. This suggested that low computer self-efficacy and increased computer anxiety were associated with a higher likelihood of negative attitudes toward learning of ICT.

According to a national survey conducted in Scotland among first-year teacher education students in Britain, the students had very positive attitudes toward ICT and were therefore excited to use it in their professional work (Simpson et al., (in Tezci, 2011). Teo (2011) conducted a study in Singapore and found no gender-specific differences in the positive attitudes toward computers among the pre-service teachers at Nanyang Technological University, National Institute of Education. Unfortunately, it was not every student who was learning ICT who acquires positive attitudes towards the technology. While many students approach computer training with a positive attitude and acquire the skills needed to use computers effectively, some US undergraduate business students developed a dislike for using technology (Torkzadeh et al., 2011).

Manpreet (2019) carried out a study in India to look into the attitudes and opinions of Indian school teachers toward the teaching of the ICT subject and how ICTs are used in the classroom. One hundred and twenty teachers employed in secondary schools in North India made up the sample. Quantitative data was gathered through the survey approach. Semi-structured interviews were used to support the findings in order to gain a thorough knowledge of the main motives and beliefs behind teachers' usage of technology. The results disclosed that, while Indian teachers have a good attitude towards the teaching and use of ICT, there was insufficient utilization of ICT in Indian classrooms. The main issues and concerns this study found with teachers included: limited use of ICT tools, lack of modern and technological infrastructure, strict timetables and curriculum, low technical support, ineffective training, absence of contemporary methods of evaluation, diploma-oriented education and low levels of competency and motivation on the part of teachers when using ICT. Additionally, the study revealed that teachers' ICT usage was gender neutral. According to the research findings, innovative approaches to teacher preparation were needed to support and promote the efficient use of ICT in Indian classrooms.

Venkateswar and Rajashree. (2020) conducted a descriptive and comparative study on the attitudes of teachers at Gangadhar Meher University in Sambalpur on the use of ICT. The study compared teachers' attitudes according to their gender and stream. The descriptive cum causal comparative approach was used and sixty teachers were selected at random. A standardized attitude scale was employed to gather data. According to the study's findings, almost 60% of teachers had a very positive attitude towards teaching ICT as a subject, while the remaining 40% had a negative attitude. The results of the study

also indicated no appreciable differences in teachers' attitudes regarding their gender and stream.

In Africa, Kalanda (2015) did a study at the Lesotho College of Education. The investigation reported that when students, teachers and the classroom environment were all seen positively, students' attitudes toward ICT would also be positive. In Zimbabwe, Dlodlo (2014) did a research at the Department of Technical Teacher Education at the National University of Science and Technology. The research established that both male and female student teachers acquired computer skills and self-assurance in using ICT. Gender differences in attitudes were also not discernible.

Meladi and Olowumi (2019) conducted a study in South Africa to explore the advantages of teaching ICT to improve individual performance, writing abilities, critical thinking abilities and personal development. They also looked at the impact of ICT integration on the quality of teaching and learning in the classroom. The research focused on nine Grade 12 students and seven teachers. Data for the study were collected using an observation schedule, a questionnaire and an interview schedule. According to the findings, although teachers had a positive attitude toward the ICT subject, the government still had a lot of work to do to start the process of integrating ICT into education, provide teachers with ICT skills and phase out traditional teaching and learning approaches.

Similar to this, Yusuf (2012) researched in Nigeria and found that, over 50% of student teachers from the University of Ilorin's faculty of education had a positive attitude toward

ICT, but 27.75% said that ICT would not be useful to them. Further, in an exploratory study in Ghana among senior high school students, where the learning of Computer Education was compulsory, Opoku and Kuranchie (2014) study reported that 90% of the students had positive and favourable attitudes towards ICT Education. These studies implied that there is also a sizable minority of students who lack a positive attitude to ICT. This should cause great concern to educators and counsellors (Adebowale et al., 2015).

To implement the Digital Learning Programme (DLP) throughout the country, Kenya started providing ICT education to primary school teachers in 2015 . This training promotes using technology to enhance pupil learning and instruction (Matiang'i, 2015; Ng'eno, 2015). Pre-service teachers' opinions and insights play a critical role in influencing their future teaching behaviours (Wang, 2012). Since prospective teachers would be the ones implementing the DLP in primary schools in the future, it was necessary to determine whether the goal of teaching them about ICT and helping them to have positive attitudes toward it was being met by the ICT course that was introduced in Kenyan teacher colleges in 2004.

After the Ministry of Information and Communications (MIC) released the National Information and Communications Technology Policy to emphasize the significance of harnessing ICT's potential, Kenya formally began to support the use of ICT for the country's social and economic development. Its objective was "a prosperous ICT-driven Kenyan society" (MIC, 2016) The National ICT Strategy for Education and Training was launched by the Ministry of Education (MOE) six months later. The Ministry of Education (MOE) and the Ministry of Higher Education, Science and Technology

(MHEST) highlighted in their sessional paper No. 1 of 2019 that the ultimate goals of ICT in Kenya's education sector were twofold. First, there was e-government, which aims to use ICT to boost the effectiveness of government operations and the provision of services, including education. Second, the goal of developing interactive e-learning was to incorporate ICT into national teaching and learning practices (MOE & MHEST, 2012). The earlier initiative to promote ICT use in education was spurred by a major curriculum review for teacher education, which led to ICT becoming a core and mandatory subject in primary teacher training institutions starting in 2004. Teaching ICT to primary teacher trainees with the intention of assisting them in developing a positive attitude toward technology and producing students capable of using ICT to enhance the teaching and learning of a variety of subjects in both primary and teacher education was one of the main objectives of ICT instruction (Kenya Institute of Education-KIE, 2004.).

There hadn't been any studies on attitudes toward ICT in Kenyan primary teacher colleges, despite the fact that, attitudes are the primary factor supporting ICT learning. However, some studies on Kenyan students' attitudes toward ICT at other educational levels were encouraging. Mbwesa (2011) found that 85.1% of University of Nairobi undergraduate Extra Mural Studies students had a favourable opinion of online learning. In Kisumu County Secondary Schools, 82% of geography teachers and 69.1% of students had a positive opinion of the use of computers in the classroom (Osodo et al., 2010). Some students of ICT may dislike the technology. The teacher trainees are anticipated to be a key component in Kenya's adoption of the digital learning program, however, the potential benefits of learning ICT for teacher trainees and their future students are

jeopardized when they begin to harbour negative attitudes towards the technology. Therefore, investigating the ICT attitudes of teacher trainees was essential.

1.3 Statement of the Problem

According to the Ministry of Education strategic plan (2018-2022), the Government of Kenya was aiming to become a knowledge-based economy by 2030. Education was deemed the ideal means of equipping the nation with the computer skills required to produce an ICT-literate labour force, which is the cornerstone of the desired economic standing (*MoE, 2023). Kenya began preparing primary school teachers in 2015 to support pupils' use of ICT in the classroom in order to operationalize the DLP across the entire nation. The Kenya National ICT policy of 2019 emphasized incorporation of ICTs in education as part of a long-term quality improvement strategy. Despite the numerous advantages inherent in the ICT subject, many teacher trainees do not put a lot of emphasis on the subject at the teacher training colleges. This has influenced their competencies in ICT. (UNESCO, 2019). Although there is strong emphasis given to ICT education, little has been done to evaluate the attitude towards ICT and intervention measures among teacher trainees in teacher training colleges. Studies have revealed that, teaching of ICT education neglects students' attitudes towards ICT. Without the development of these attitudes, students will not be successful nor will they be prepared to acquire new knowledge and to achieve good results in the academic sector. It is in this context that this study was set to fill this gap through investigating the attitudes of primary teacher trainees toward ICT in public primary teacher colleges in Machakos County in Kenya.

1.4 Purpose of the Study

The purpose of this study was to explore the attitude of teacher trainees towards ICT and intervention measures taken to promote a positive attitude towards learning ICT in public primary teacher training colleges in Machakos County in Kenya. As the rest of the world is geared towards technology, student teachers are required to be prepared on how to integrate ICT so that in their professional carrier, they integrate ICTs in teaching and learning for meaningful and effective instruction.

1.5 Objectives of the Study

The objectives of the study were to:

- i. determine the proportions of teacher trainees' having positive attitudes towards ICT and those holding a negative view.
- ii. assess the challenges influencing teacher trainees' attitudes towards ICT
- iii. establish the influence of computer experience on teacher trainees' attitudes toward ICT,
- iv. investigate the influence of specialisation in science or arts on teacher trainees' attitudes towards ICT,
- v. establish the influence of gender on attitude towards ICT among teacher trainees and
- vi. find out the intervention measures on teacher trainees' attitudes towards ICT in public teacher training colleges in Machakos County in Kenya.

1.6 Research Questions

The study was guided by the following research questions:

- i. What are the proportions of teacher trainees' who view ICT subject positively and those with a negative view in public teacher training colleges in Machakos County in Kenya?
- ii. Which challenges impact teacher trainees' attitudes and learning of ICT subject in public teacher training colleges in Machakos County in Kenya?
- iii. What influence Does computer experience have on teacher trainees' attitudes toward ICT subject in public teacher training colleges in Machakos County in Kenya?
- iv. What influence does specialisation in science or arts have on teacher trainees' attitudes towards ICT subject in public teacher colleges in Machakos County in Kenya?
- v. Does gender have an influence on attitude towards ICT subject among teacher trainees in public teacher training colleges in Machakos County in Kenya?
- vi. What are the intervention measures used to promote teacher trainees' positive attitude towards ICT in public teacher colleges in Machakos County in Kenya?

1.7 Assumptions of the Study

The following were some of the underlying assumptions that guided this investigation. As mandated by the Primary Teacher Education Syllabus, ICT is a core and required subject for all PTTC trainees in both their first and second year. The trainees are expected to honestly answer the questions reflecting their attitudes toward ICT and opinions on related issues. Additionally, it is assumed the research will yield valid and reliable data.

1.8 Limitations of the Study

The participants' concern that their identity may be exposed and the information gathered might be used against them may have limited the study's scope. To ease this restriction, the researcher informed the respondents that their names would remain anonymous and that the data collected would only be used for the study. To achieve this, the respondents were asked not to write their names on the questionnaires. Additionally, the researcher had no influence over the opinions of the respondents. Some of them may have been uncooperative and may have given responses to appease the researcher. This might have affected the study's validity. In order to overcome this constraint, the researcher assured the respondents that their opinions would be treated honestly. Additionally, because private primary teacher training colleges were left out of the study, it was inept to extrapolate the findings to all primary teacher training colleges, which may have constituted another constraint. In order to address this, the researcher has suggested that additional, similar investigations be carried out at private primary teacher training colleges.

1.9 Delimitations of the Study

The study only focused on factors that influence the attitude of teacher trainees towards ICT subject and intervention measures taken to promote a positive attitude towards learning using computers in public primary teacher training colleges in Machakos County in Kenya. These variables were measured in terms of study objectives touching on: proportions of teacher trainees' having positive attitudes towards the ICT subject and those holding a negative view, the challenges influencing teacher trainees' attitudes towards ICT, the influence of computer experience on teacher trainees' attitudes toward

ICT, the influence of specialisation in science or arts on teacher trainees' attitudes towards ICT, the influence of gender on attitude towards ICT among teacher trainees and intervention measures on teacher trainees' attitudes towards the ICT subject. The study dealt with one region, Machakos County and therefore the data generated should be interpreted with caution when generalizing the results to the entire country especially private Teacher Training Colleges and areas with well-developed ICT systems in place. The sample of the study was drawn from the public teacher training college in Machakos County.

1.10 Significance of the Study

This study may be significant because it may establish teacher trainees' attitudes toward technology in education, which is crucial for future primary teacher college students taking computer literacy courses, their tutors and those planning to pursue additional research in this area in Kenya. ICT tutors in Teacher Training Colleges may benefit when the findings from the research are shared, as they may be aware that there are teacher trainees who may find ICT to be enjoyable, as well as those who may not. In order to mitigate this, ICT teachers might begin to monitor more closely how students, particularly those who do poorly in the subject, come to feel negatively about the technology. Furthermore, the study may have a significant impact on tutors' awareness of the need to use guidance and counselling to stop trainees from developing a bad attitude toward ICT. The findings of the study may also benefit upcoming teacher trainees, as they might make it simpler for tutors to encourage and sustain students' positive attitudes toward ICT learning. Student teachers may thus have a deeper understanding of and appreciation for ICT. Policymakers may also benefit from the study's findings, which emphasize the need

to include ICT subject in the national PTE examinations. This may encourage students to take the subject more seriously and shed their anti-computer sentiments. Lastly, the study's findings may be helpful to researchers interested in learning more about the attitudes of teacher trainees regarding ICT learning. These researchers could repeat this study or look into other issues that the research has brought up.

1.11 Theoretical Framework and Conceptual Framework

1.11.1 Theoretical Framework

Albert Bandura (1971) social learning theory provided the basis for this study for the attitude of teacher trainees towards ICT and intervention measures taken to promote a positive attitude towards learning ICT in public primary teacher training colleges in Machakos County in Kenya. The social learning theory emphasizes that, people learn by observing others, imitating their behaviors and experiencing the outcomes of those behaviors. To achieve this, teachers can create environments that promote effective learning and development through observation and imitation. This theory has several practical applications which include modelling desired behavior in the teaching of ICT by teachers where teachers can demonstrate positive behaviors and skills which students can imitate. The theory also encourages peer learning where students can learn from one another through group activities and discussion. Teachers can use this theory to capture students' attention through engaging and relevant lessons, where repeating and practicing can help students retain observed behaviors. The theory can also be used to motivate students by highlighting the rewards of learning and positive behaviors. Bandura (1971) also emphasizes the role of self-efficacy in enhancing learning. Teachers can enhance

students' self-efficacy by providing positive feedback, setting achievable goals and encouraging perseverance.

Bandura's (1971) social learning theory has been criticized for largely ignoring biological influences on behaviour such as genetic predispositions and neurobiological processes, oversimplifying the learning process by not fully accounting for the complexity and variability of human behaviour across different contexts and over a person's life, down playing the role of personal accountability and individual decision-making in the learning process and it tends to emphasize external reinforcement over intrinsic motivation, which can be crucial for sustaining learning and behaviour change.

Due to these weaknesses this theory was complemented by B. F. Skinner's (1957) operant conditioning learning. According to the operant conditioning theory, learning occurs when the learner's behavior is followed by a consequence or reinforcement. Operant conditioning learning theory is based upon the idea that learning is a function of change in overt behavior. Change in behavior is a result of an individual's response to events (stimuli) that occur in the environment. When a particular Stimulus -Response (S-R) pattern is reinforced (rewarded), the individual is conditioned to respond. Operant conditioning learning can be beneficial in learning in various ways. Positive reinforcement increases the likelihood of a behavior being repeated, immediate feedback gives students morale of copying the behavior from others and extinction of reinforcement makes undesirable behavior in learners recur. This theory has been criticized for ignoring cognitive processes, assuming learning occurs only through

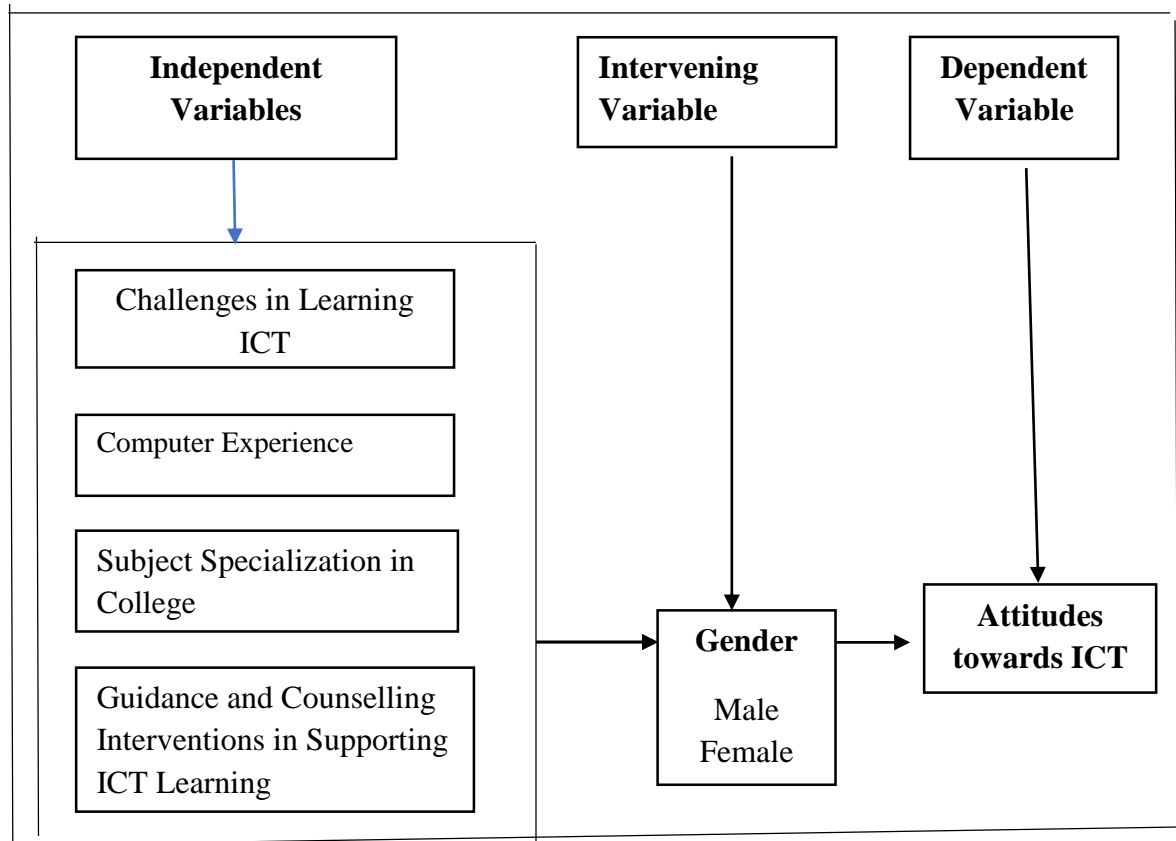
reinforcement, which is not true and overlooks genetic predisposition and species-specific behavior patterns which can interfere with it.

Despite the critiques, the two theories were relevant for this study since it is a productive way of considering how teachers could change student attitudes toward ICT. Additionally, the two theories can also serve as a measurement of teachers' knowledge in ICT subject matter, content and pedagogy, potentially influencing both students' attitudes and professional development offerings for teachers at all levels of experience. Further, the two theories can assist in minimizing the teachers' tendency of treating technology as if it was separate from teaching and learning. It follows that professional development for teachers should desist from training teachers on how to use some particular software or app only, but also on how to fit it into the classroom. By so doing, teachers will have self-efficacy in application of ICT and thus shape their attitude and feelings of the learners towards the ICT subject in classrooms.

1.11.2 Conceptual Framework

Figure 1.1.

Conceptual framework showing the relationship between independent and dependant variables



(Source: Field work)

The attitude of the teacher trainees towards ICT was the only dependent variable in this conceptual framework. The independent variables were the other four variables. These included the challenges that teacher trainees faced when acquiring ICT skills, their familiarity with computers, their college subject specialization and the application of guidance and counselling. The intervening variable or intervening factor was gender. As a consequence, the framework shows how the variables that are independent relate to the variable that is dependent, which is attitude toward ICT in relation to gender.

1.12 Operational definition of key terms

Attitude: Refers to a teacher trainee's opinion or belief about ICT reflected by their attitude mean score on the computer attitude scale. It may be favourable (if above 3) or unfavourable (if below 3) .

Attitude towards Computer: The term describing a teacher trainees' general feelings towards the computer and particular computer-related tasks as shown by the overall mean score on the computer attitude scale.

Computer experience: Refers to the number of years that each trainee teacher has used computers and their response to it.

Computer self-efficacy: This refers to a teacher trainee's assessment of their ability to use computers for task completion as reflected in their chosen confidence level

Information and Communication technology This term describes desktop computers and their programs, which are taught to teacher trainees at the Primary Teacher Education College as one of their major subjects. Furthermore, it also refers to the laptops that the college tutors may use to deliver their lessons

Public Primary Teacher Training Colleges (PTTCS): These are government-owned teacher education for institutions in Kenya that prepare O level graduates In a two-year certificate program in primary teacher education

Teacher trainee: This refers to a student enrolled in a government-owned college in Machakos County in Kenya for the primary teacher education program.

Subject specialization: This describes teacher candidates who are in their second year of primary teacher education and are pursuing science (option A) or arts (option B) as their subjects in Machakos TTC

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter provides a summary of the literature review relevant to the study on attitude towards information communications technology and intervention measures among teacher trainees in Public teacher training colleges. The chapter focuses on study reports from various countries which teach ICT in their teacher education curricular. This chapter discusses proportions of teacher trainees' having positive attitudes towards ICT subject and those holding a negative view, challenges influencing teacher trainees' attitudes towards the technology, the influence of computer experience on teacher trainees' attitudes toward ICT, the influence of specialisation in science or arts on teacher trainees' attitudes towards ICT, the influence of gender on attitude towards computers among teacher trainees and intervention measures against teacher trainees attitudes toward ICT. Along with a summary of the literature review, a theoretical framework and a conceptual framework are all explored. This literature review aimed at identifying the gaps in relation to the current study.

2.2 Students Attitude Towards ICT

Research on attitudes towards computer literacy have established that, while some students and teachers have a positive attitude towards ICT, others hold a negative view. According to a US study by Torkzadeh et al. (2011) participants in computer self-efficacy training programs seemed to respond more positively to ICT education when they had a positive attitude towards it and less favourably when they had a negative attitude. Other

studies concerning students' attitudes towards ICT education have been conducted worldwide.

In India, Samson (2013) did a study on teacher trainees' attitude towards ICT. The research focused on the level of attitude towards ICT among Bachelor of Education teacher trainees. The sample of the study was 952 teacher trainees. The investigation used personal data sheet and attitude towards ICT scale developed by the researcher. The results revealed only 39.5% of the trainees had a positive attitude towards ICT while a majority of them (60.5%) had uncertainty in their views. This study was limited in that it was done among teacher trainees pursuing a Bachelor's degree in education in India, therefore its findings might not apply to the situation in Kenya where the trainees sampled do not pursue a bachelor's degree., even though it might be pertinent to the current investigation. Thus, the current study was necessary to examine teacher trainees' attitude towards ICT in public primary teacher training colleges in Machakos County, Kenya.

In Pakistan, Akram et-al. (2022) conducted an investigation on teachers' perceptions regarding teaching of ICT at all educational levels in light of the previous studies performed in the last 5 years in Pakistan. The study revealed teachers' positive perceptions regarding teaching of ICT. They believed that use of ICT could assists them in enhancing their instructional practices effectively, making the learning process exciting and interactive and keeping learners motivated. Although this study may be pertinent to the current investigation, it should be noted that because it was carried out in Pakistan among working teachers, its findings may not be applied to the circumstances in Kenya where the subject of research were teacher trainees. Hence this study researched teacher

trainees' attitudes towards ICT in public primary teacher training colleges in Machakos County, Kenya.

Yusuf (2012) conducted a study on teachers' competence and attitude among 382 student teachers enrolled for bachelor's degree at Ilorin University, Faculty of Education in Nigeria. The research used a questionnaire to collect data from the respondents training to teach in secondary schools. The data collected was analysed using percentages, means, and chi-square statistics. Over 50% of respondents had a positive opinion of ICT, with only 27.75% of respondents claiming that it would not be valuable to them. Nevertheless, it is worth noting, even though this study might be relevant to the current one, its results might not apply to the Kenyan context because it was carried out on university teacher-students in Nigeria training for secondary school teaching. Therefore, the present study, investigated teacher trainees' attitudes to ICT in public primary teacher colleges in Machakos County in Kenya whose graduates will teach in primary schools.

Mbwesa (2011) did a survey with one-semester diploma students to study the attitudes and level of anxiety of the undergraduate students towards online learning. The learners were enrolled in their diploma courses as a required research techniques unit. The majority of undergraduate students (85.1%) at the University of Nairobi's Extra Mural Studies Department felt favourably about the online education teaching approach, according to the survey. There were also students who were uncertain about online learning; and others who disliked the arrangement and would not take an online course again. There were 282 students enrolled overall in those diploma programs. Nonetheless, 100 (45%) of the population, were the subject of the study. 86 students responded to the Likert attitude scale questionnaire that the researcher created. Although this study may

be related to the current investigation, it should be noted that because it was carried out in Nairobi County, which is urban its conclusions cannot be applied to the circumstances in Machakos county, which is rural in nature. Further, the sample is drawn from the university while the target of this study was Primary school teacher trainees. Consequently, the current study surveyed teacher trainees' attitudes towards ICT in public primary teacher training colleges in Machakos County in Kenya to fill the gap.

Osodo et al. (2010) did a survey study in Kisumu County to learn more about Kenyans' attitudes toward computers. Specifically, his study was aimed at establishing the attitudes of teachers and students towards computer use in Geography education and the differences in attitudes between the two groups in the use of the technology in the subject. The researcher selected 1,165 form three students and 80 geography teachers. the study used 30% of the target populations and simple random sampling techniques to create the study sample. 82% of geography teachers and 69.1% of their students had a positive attitude regarding use of computers in simulations and teaching and learning in the subject of geography. The investigators utilized an altered form of the forty-item Computer Attitude scale (CAS) survey. Since this study was carried out in Kisumu County among secondary school students and teachers, its conclusions might not apply to the circumstances in Machakos County, even though the study might be related to the current investigation. This justified the need for the present study on teacher trainees' attitudes towards ICT in public primary teacher training colleges in Machakos County in Kenya.

In conclusion, studies on attitudes towards computers have been reviewed in this section. However, the results could not be generalized to the public teacher training colleges in

Machakos county because the teacher trainees are neither secondary school students nor university students and their ICT learning circumstances were different from those presented in the reviewed study programmes. Therefore, because it was yet to be done, researching the attitude of teacher trainees and establishing proportions of those with positive and those with negative attitude towards computers filled this gap.

2.3 Challenges Influencing Teacher Trainees' Attitudes Towards the Learning of ICT

The way student teachers encounter ICT both within and outside the classroom shapes their attitudes toward computers. The trainees' access to computers may have an impact on how well they learn the material on the technology and how they feel about ICT. To enable student-teachers to become proficient with hardware and software, access to the ICT equipment should be practical (UNESCO, 2012). According to Niederhouser and Perkman (in Tezci) several European nations provide appropriate access to technology by investing heavily in ICT infrastructure in their schools. This makes it easier for students and teachers to use computers. Despite countries investing immensely in ICT education, studies worldwide have indicated that there are challenges which affect the computer attitudes and learning of ICT.

Students gain an appreciation for ICT when teachers model how to use computers in the classroom. Additionally, teachers who incorporate ICT into their other subject areas reaffirm to students the significance of computers and computer literacy in all subject areas. Teachers must value ICT and utilize it in their professional work if they want to

encourage student-teachers to incorporate it into their training and duties (Stevens & Lonberger, 2018).

Aminuddin et-al. (2022) conducted a study on Gender differences on the acceptance and barriers of ICT use in English language learning from the students' perspectives at Takhar University, Afghanistan. A quantitative research method was utilized and a total of 152 respondents answered the questionnaires. The findings of the study indicated that although the participants held positive perceptions on the use of ICT in learning the English language at Takhar University, barriers to the use of ICT existed. They included poor internet/Wi-Fi access, unreliable electricity, technological devices, ICT infrastructure, little time and confidence in using ICT, insufficient training and inadequate support. Although this study may be relevant to the present study because of the research methodology used, it may be limited because it investigated gender differences on the acceptance and barriers of ICT use in English language learning from the students' perspectives and therefore its findings may not be generalized to the Kenyan situation Because the circumstances are different. Therefore, the need for the present study to investigate challenges affecting the attitude towards ICT and among teacher trainees in public primary teacher colleges in Machakos County in Kenya.

Teo (2011) investigated the computer attitudes of 139 post-graduate diploma pre-service teachers through a survey administered at the National Institute of Education, Nanyang Technological University, Singapore. The researcher administered the 21-item Likert-type Computer Attitude Scale (CAS, Selwyn, 1997) to volunteers enrolled in the primary and secondary education study programs. The participants' overall mean score of 3.85 indicated that they had positive feelings about the computer. The study further established

that the students' positive attitudes can be attributed to the government of Singapore providing good computer access to all students throughout the educational system. Even though this study is pertinent to the current one because it deals with pre-service teachers attitude to ICT, its applicability may be limited because it was carried out in Singapore among postgraduate education students and its findings might not apply to the situation in Kenya where the teacher trainees are not graduates. Therefore, there was need for the present study to investigate challenges influencing the attitudes and learning of computers in the Kenyan context of public primary teacher colleges.

In Malaysia, Bangi (2020) investigated the challenges faced by the students in learning ICT and their attitude towards computers among the urban school students in Kuala Terengganu. Data was collected via a questionnaire survey of second language students. The results showed that, even though students had high positive attitudes and were aware of the benefits of learning ICT, they spent only 1- 2 hours per week learning ICT. Most of them use ICT for surfing the internet to get information and for searching for words meaning and pronunciation. The results of this related study, however, cannot be extrapolated to the Kenyan context because it was carried out in Malaysia among students learning a second language. Accordingly, the existing study researched teacher trainees' challenges affecting their attitudes towards computers in public primary teacher training colleges in Machakos County in Kenya.

Abdallah et al., 2021) did a study on the challenges facing the integration of ICT in the Ghanaian Educational System. The study used a configurative synthesis approach to

obtain systematic reviews of qualitative secondary data to examine the challenges facing the integration of Information and Communication Technology (ICT) in the Ghanaian educational system. 24 publications dated between 2007 and 2020 were selected for an in-depth analysis based on their relevance to the current study and their consistency in addressing its research questions. The study established the lack of ICT infrastructure, high cost of computers and other technologies, poor internet connectivity, intermittent power fluctuations and teachers' inadequate knowledge or technical know-how in ICT as the challenges associated with the use and teaching of ICT/computers in Ghanaian education. Even though this study might be significant to the current one, it might have limitations because it targeted Ghana and relied on documentary analysis to gather its data. For this study it was necessary to get primary data therefore, questionnaires were used to collect data from 196 teacher trainees on their challenges affecting their learning and attitudes to computers.

In his study, Yusuf (2012) found more than 50% of the student teachers at the University of Ilorin in Nigeria were incapable of using databases, online authoring tools, spreadsheets, presentations, and other supplemental ICT tools. To support the development of those critical ICT integration competencies, Yusuf (2012) proposed giving all students free access to the media labs whenever they needed it to ensure their access to ICT. In the media labs at Nigerian universities, student-teachers learn and hone their ICT skills. Although this study might be pertinent to the current investigation, it should be emphasized that it may have limitations because it was carried out in Nigeria among university teacher-students and its findings might not apply to the circumstances in Kenya.

Maruti (2010) did a study on the level of preparedness among five Public Teacher Training Colleges in Kenya to use electronic technology in learning and produce teachers with competence to handle e-learning in primary schools of Kenya. The sample of the study consisted of 2,787 individuals, comprising 155 tutors, 5 college principals and 2,632 teacher trainees. Purposive sampling techniques was used to select the principals and stratified sampling techniques was used to select the students and tutors. Data collecting methods included observation schedules and questionnaires. The descriptive survey design was adopted for the inquiry on e-readiness of the teacher colleges. The study revealed that students had a maximum of two hours per week per class to use the computer labs. According to the students, assessment, this was not enough time for sufficient machine practice. Where teacher trainees have little or no access to computer resources, they may find learning the subject difficult and thus, not like it. Despite the fact that this study might be important to the current one because it uses the descriptive study design, it might have limitations because it employed stratified and purposive sample techniques on 2632 teacher trainees, 5 college principals, and 155 tutors. Additionally, the study used questionnaires and observation schedules to gather information from the participants. In this study, 196 student teachers from Machakos County were selected using the random sampling technique. In addition to this, data from the respondents was gathered through questionnaires only.

In Kenya, Teacher trainees' attitude and ICT learning are likely to be influenced by how much time they spend practicing computer skills. This is due to the fact that the KPTTCs' ICT curriculum is primarily practical. The acquisition and application of ICT skills by

student teachers during their teacher education program may shape how they will use ICT as professional teachers in the future (Allan, 2017). In addition, students who acquire technological skills are better equipped to comprehend and absorb new information about technology (Kozma, 2015). This leads one to the conclusion that, in particular, students at KPTTCs will learn less about ICT and develop a negative attitude toward computers in terms of perceived control, usefulness and behavioural intention if they will not have enough practice using computers.

Oredo, (2013) investigated the amount of computer use per week by students and teachers in five Public Teacher Education Colleges. The study used questionnaires to collect data from 45 teachers and 120 student- teachers. The results from five public teacher education colleges reported 14% as the overall amount of computer use per week by students and teachers. Despite its potential relevance to the current investigation, this study may have limitations because it only included 120 teacher trainees and 45 teachers in its data collection. The current study used a questionnaire to gather data from 196 teacher trainees from Machakos County and excludes the tutors. .

The fact that ICT is not tested in the national PTE Examination for teacher trainees may potentially have an impact on how TTCs students approach and learn about ICT. According to Ngu of , UNESCO (2012) ICT use may be ignored in states that place a high priority on exam success because it is thought to undermine students' exam performance. Secondary school teachers in Kenya typically held the opinion that students lose out on important study time for national examinations when they use computers in the classroom (Ford, 2011). Lack of a national exam for ICT in PTE caused most students

to not treat the subject with the seriousness it deserved, according to Maruti's investigation in five TTCS in Kenya (Maruti, 2010).

Although ICT is a required subject for the two-year Primary Teacher Education program, exams in this field are not administered by the Kenya National Examinations Council (KNEC). Three internal college exams are taken by the trainees in the first, second, and fourth terms. Additionally, they do a mock exam in the fifth term and a mid-course exam at the end of the first year. There is absolutely no testing in the sixth term (KIE, 2004). However, they receive a generic college certificate in ICT that doesn't accurately reflect their level of ICT proficiency. In this study, teacher trainees provided their opinions on whether a lack of a national ICT exam was one of the challenges discouraging TTCs students from learning ICT.

Finally, it is worth noting that the challenges influencing students' learning and attitudes towards ICT reported by researchers from Afghanistan, Singapore, Malaysia, Ghana, Nigeria, and Kenya may not be applicable for Public teacher education colleges in Machakos county because the circumstances for learning ICT may be different therefore, this study was done to bring out the challenges through self-reports of teacher trainees.

2.4 Influence of Computer Experience and Attitude Towards ICT

Another significant element influencing attitudes toward ICT is computer experience, according to an assessment of the literature in this area. Huang and Liaw (2005) found that prolonged computer use will result in positive feelings if it is satisfactory and negative ones if it is not. According to Fisher (2011) about 86 percent of pre-service student teachers enrolling in introductory education courses at Marquette University in the Midwest of the United States believed they had prior experience with computer

software applications, according to a research by Fisher. In comparison to the novice group, who experienced computer anxiety, they exhibited more positive attitudes regarding computers due to their longer computer experience. 205 students from elementary, middle, and secondary education programs were given the self-assessment survey of the abilities, attitudes, and perceptions regarding using computer technology in the classroom.

In Singapore, Teo (2011) investigated the attitudes of pre-service teachers towards computer use. His study found that the duration of using ICT was positively connected with one's computer confidence and a favourable attitude towards the technology. Survey respondents had been using computers on average for 9.63 years ($SD = 3.27$). They all admitted to having ready access to computers. Though the US study and the Singaporean studies are related to the current one because they investigate the ICT attitude in relation to experience of education students or future teachers, however the findings are not generalizable to the public teacher training colleges in Kenya because the socio-economic situations in the US and Singapore are different from the local one. Therefore, there was need for this research to establish the state of affairs in Machakos public Teacher training colleges in Kenya.

Levine & Donitsa-Schmidt in their research on computer Use, confidence, attitudes, and knowledge in Israel, found that computer expertise had a beneficial impact on computer confidence and attitudes. The research was carried out on 309 students in grades 7 through 12 from eleven non-vocational schools (Levine & Donitsa-Schmidt, 2013). Though relevant, these findings may not be applicable because they were established among secondary school students in Israel, which has different educational circumstances. Thus,

there was need for this research exploring the influence of experience on computer attitudes for public Primary teacher training colleges in Machakos county.

In Africa, Yusuf (2012) study found that student-teachers had positive attitudes towards computers in Nigeria. Over 60% of them stated that they acquired their computer knowledge and skills outside of the classroom through personal training, family, and friends. This happened because the ICT program at the university was both too general and inadequate to meet their needs. In a Kenyan study Wambiri & Ndani (2016) established that younger teachers, those 40 years and less, had more positive attitudes and beliefs about the value of computers than older teachers did. This was because, in contrast to the older teachers, the younger teachers had been trained on ICT while in college and had additional practice using computers or associated devices on a regular basis. The research sample was 236 teachers of standard 1-3 in 31 public schools in Kiambu County in Kenya (Wambiri and Ndani, 2016). The results of this study suggest that younger teachers had a more positive opinion of ICT than older teachers because they had more experience with computers and related technologies. The Wambiri study depicts the computer attitudes of serving teachers in relation to their experience with ICT while The current study looked at the impact of teacher trainees' experiences on ICT attitude, as a result, their positive or negative computer attitude was taken into account in relation to their level of computer proficiency therefore justifying the need for the current research to represent the situation in the Public teacher education colleges in Machakos county.

2.5 Influence of Subject Specialization and Attitude Towards ICT

An analysis of related literature reveals that differences in attitude towards computer based on subject specialisation can be varied. Some researchers found comparable computer attitudes regardless of the area of specialisation. According to Teo (2011) who did a study on pre-service teachers pursuing postgraduate diplomas in education in Singapore, participants in the education programme shared similar computing attitudes despite the fact that certain students focus on the humanities, while others on sciences or languages. The study by Teo is relevant to the current one though not generalizable to the Kenyan context because it was done in Singapore among post-graduate education students. Thus, there was need for this research to investigate the influence of subject specialization on attitudes towards ICT in teacher training institutions in the stated county.

Some other researchers have determined that, students studying various subject areas or fields of study have distinct attitudes regarding computers. When compared to students in social sciences, science and art departments, students in Turkey's language teaching and computer education departments were shown to have more favourable opinions to ICT and the internet (Tezci, 2011).

Adebowale et al. (2015) conducted a survey study on students' attitudes toward ICT, computer self-efficacy and anxiety. 600 senior secondary 3 (SS III) students from six schools in the Nigerian state of Lagos were chosen for the study using a proportionate sampling method. Analysis showed that the study field had a major impact on participants' perceptions of computers and degree of computer self-efficacy.

Consequently, students studying vocational disciplines had the best attitudes toward computers, followed by those studying commercial subjects, who also showed more positive attitudes than those studying science and the arts. Though the two studies on the influence of subject specialization on computer attitudes by Tezci, 2011 study on Turkish trainee teachers and the Adebowale et al. (2015) on secondary school students are relevant to this study, their applicability is limited because they were conducted in Turkey and Nigeria where the circumstances are different. However, due to the fact that There is subject specialization available in the KPTTCs Therefore there was need for research on the influence of specialization on computer attitudes in teacher colleges. Trainees in teaching in their second year have the choice of electing to study science (Option A) or the arts (Option B), with ICT being a required subject for all.

2.6 Gender Differences and Attitude Towards ICT

The digital gender divide is one of the most critical issues in education today. Digital gender gaps can exist in students' access to and use of ICT, attitudes toward technology and digital knowledge and skills.

The issue of how gender influences people's attitudes about ICT has also been looked at in this study. This is a result of the wide range of study findings on the subject. Disparities in attitudes about ICT between genders have been found by several researches. Bebetos and Antoniou (2012) In the study on ICT attitudes among physical education students at a Greek university, found statistically significant gender disparities in the ICT views of men and women, even though the majority of them owned personal computers and utilized computers for school-related purposes. the male participants showed a higher inclination towards computers and perceived them as more valuable than the female

participants. The 21-item CAS (Selwyn, 1997) questionnaire with four components was completed by a sample of 165 first-year students, 93 of whom were male and 72 were female.

Awofala et al. (2019), explored attitudes towards computers, gender and computer anxiety as determinants of computer self-efficacy. The survey was among 2100 pre-service science, technology and mathematics (STM) teachers from the University of Lagos in Nigeria. The utilised the quantitative research method within the descriptive survey design. Descriptive statistics of percentages, means, and standard deviations and inferential statistics of independent samples t-test, Pearson product-moment correlation coefficient and multiple regression analysis were employed to analyse the collected data. They found statistically significant gender differences in computer attitudes between the male and female. The male had significantly higher computer attitude scores ($M=48.04$, $SD=4.57$) compared to the female ($M=46.29$, $SD= 4.33$). These two studies are relevant to the current one because they involved university students and STEM Teachers, however, not applicable because the Greek and Nigerian educational experiences differ from the Kenyan situation in public teacher education colleges.

Additionally, several researches found no variations in views about ICT between genders. Teo (2011) conducted a study in Singapore. The study found, no gender differences in the ICT attitudes of the post-graduate students of education. Similarly, according to Yusuf (2012) there was no significant difference found between the responses from male and female respondents in a survey study conducted in Nigeria on the computer attitude and

proficiency of student-teachers. Kalanda (2015, in Lesotho and Dlodlo (2014, in Zimbabwe were able to come to similar results.

The results of other researchers indicate the female have a better attitude towards computers than their male counterparts. Ariana (2019) investigated the attitudes towards the use of selected ICTS in English learning, among 928 Vietnamese, non-English major college students in the United States. 61.2% of the students reported positive computer attitudes. There were also significant differences in ICT attitudes between the genders with female students having more positive attitudes than the male regardless of their comfort level in using computers and the internet in English language learning. However, it should be pointed out that though this study may be useful to the current one, its results cannot be applied to the situation in Kenya because it was carried out in the United States. The present study also used a questionnaire to collect data from the participants.

Diego and Ronny (2023) researched digital gender gaps in students' knowledge, attitudes and skills across 32 Countries. They utilised the 2013 and 2018 International Computer and Information Literacy Study (ICILS) student's data. Results revealed that girls did better than the boys in attitudes, digital knowledge and skills ($\beta = -0.11$ to -0.29). Nevertheless, it should be stated that even if this study might be pertinent to the current one, it was carried out in 32 different nations and relied on document analysis to gather data, thus its findings may not be applied to the circumstances in Kenya. In addition, the present study also used a questionnaire to collect primary data from the participants.

Derbyshire (2013) observed that in African schools, where computer sharing is commonplace and unrestricted, boys usually have more access than girls due to their tendency to be more assertive and self-assured. ICT classes in public teaching colleges in Kenya are attended by both male and female trainees and sharing of computers in the lab is a typical practice. Taking into consideration the earlier mentioned results, the researcher looked into whether there were any notable gender disparities in the teacher candidates' attitudes toward ICT in Machakos County.

2.7 Interventions to Promote Teacher Trainees' Positive Attitude Towards ICT

One of the primary objectives of learning the ICT subject in Primary Teacher Colleges is to help students establish a positive attitude and a sense of self-discipline toward computers (KIE, 2004). In order to prevent students from developing a negative attitude toward ICT and encourage positive responses, students can utilize Bandura's social learning theory, and Skinner's operant conditioning theory and counter conditioning theory. This will expand the students' interest in ICT.

Some researchers have made suggestions for monitoring and correcting students' negative attitude and promote positive attitudes towards ICT and computer literacy resulting from their various studies. According to Levine and Donitsa-Schmid (2013) study in Israel with secondary school students, computer use has a positive effect on perceived computer self-confidence, as well as on computer-related attitudes. Therefore, teachers can avoid development of a bad attitude about ICT in their students by doing the following. First, through class discussions, quick interviews, or the distribution of brief questionnaires to individual students, teachers should routinely assess their students'

attitudes toward computers, their degrees of ICT anxiety, and their confidence in using them. Secondly, it is important to look into the cause of each student's bad computer attitude so that the teacher can provide an appropriate solution for each person who is impacted. Thirdly, teachers can encourage students to intentionally consider how they learn technology and their attitudes and ideas about ICT in order to help them manage their computer learning and performance.

Similarly, Adebowale et al. (2015) Studied the correlates of computer attitudes, computer self-efficacy and computer anxiety among senior secondary school students in Lagos, Nigeria. He stated that career guidance specialists and school counsellors can use their expertise to help students develop positive attitudes toward computers, foster a sense of appreciation for the technology across all subject areas, increase their self-confidence when using ICTs, and manage their fears associated with the technology.

These two studies are not generalizable to Kenya and the teacher training colleges because they were held in Israeli and Nigerian secondary schools, therefore, the need for the current research to address the knowledge gap on interventions used to cultivate a positive attitude towards ICT among the trainees in teacher colleges.

Technology teachers and administrators can play a significant part in helping trainees establish good attitudes about ICT as the results of Kalanda's (2015), research in Lesotho on factors influencing students' attitudes towards ICT demonstrate. Two self-report instruments, the Classroom Learning Environment Survey (CLES) and Attitudes Toward Science Scale (ATSS) and an interview schedule with a selected group were utilized in determining students' opinions. It involved 200 first year education Diploma students for Primary, Secondary, and Technology Education. He reported a positive relationship

between attitudes towards computers and teacher characteristics, student characteristics and the classroom environment. Therefore, technology teachers should never stop convincing their pupils that computers are made just for them and that they can learn, enjoy and succeed in this area. Students' self-confidence in their capacity to study computers will grow as a result. In addition, college administrators must create and uphold a pleasant, welcoming and encouraging learning environment for ICT, which will help students develop the necessary positive attitude toward computers. Though these findings may be relevant because they were made in a study in a teacher college, they may not be applicable to the local Kenyan situation because Lesotho has a different setting.

The three researchers thought that students' growth of ICT self-confidence was essential to ensuring a positive attitude and decisive employment of computers in learning. The teacher can not only inspire the students in the reassuring ICT classroom environment, but the students will also be motivated by one another and learn from one another. Reciprocity is a key component of Bandura's social learning theory (1971), which supports this notion. Bandura (1971) and Skinner (1954) both support the use of positive reinforcement to modify undesirable behaviour. Vicarious reinforcement, observational learning, and modelling are also crucial for modifying behaviour in Bandura's view.

Rewarding pupils for their learning has long been a standard practice in educational settings, despite the dearth of research on the subject in Kenyan classrooms. Kinyanjui et al. (2015) conducted a survey study in Kenya with 200 students and 100 teachers from thirty elementary schools in the Kikuyu Sub County. The study found that the social

reinforcement strategies used on the pupils in the primary schools included empathy, warmth, attentiveness, feedback, approval, showing concern, and praising good work. Utilizing both qualitative and quantitative research methods, the study was based on Skinner's operant conditioning theory. The findings for primary schools in Kenya are not generalizable to the teacher's colleges. Therefore, this study intended to ascertain the guidance and counselling methods employed as interventions to encourage trainee teacher's favourable attitudes to ICT to fill the knowledge gap.

2.8 Summary of Literature Reviewed and Gap Identification

In accordance with the study objectives, the researcher has reviewed literature from local, regional and global perspectives. Six themes were found in the studies that were examined in this chapter then the researcher identified the gaps that this study covered for each theme.

The Studies reviewed highlighted the significance of students having a good attitude toward ICT when studying computers. Further, it was clear that the proportions of those found with a positive and those with negative attitudes towards computers was established in the United states and university of Nairobi students, practicing teachers of Pakistan and Kisumu county in Kenya, university student teachers of India and Nigeria, and secondary school students in Kisumu County, Kenya. However, both the computer attitude and the various attitude proportions among the teacher trainees in public primary teacher training colleges in Machakos County in Kenya had not been established. Thus, researching the attitude of teacher trainees and establishing proportions of those with positive and the others with negative attitude towards computers filled this gap.

According to the literature, there are challenges influencing students' learning and attitudes towards ICT as reported by researchers from Afghanistan, Singapore, Malaysia, Ghana, Nigeria, and Kenya. However, none were reported for Public teacher education colleges in Machakos county, hence, this study was done to fill that gap.

Students' attitudes toward ICT have been found to be influenced by their experience with computers. This was revealed by Fisher (2011) in the US study and Teo (2011) in the Singapore study among postgraduate student teachers, and Levine & Donitsa-Schmidt (2013) and Yusuf's research on Secondary school students in Israel and Nigeria respectively. Finally, Wambiri and Ndani (2016) concurred in the study among practicing teachers in Kenya. So, in order to determine whether this also applied to the situation in the public TTCs in Kenya, this study researched the ICT attitude of Machakos teacher trainees in relation to their computer experience to address the knowledge gap.

The impact of academic specialization on college students' attitudes toward computers has yielded inconsistent findings. From the Singapore study by Teo there were comparable computer attitudes for pre-service teachers regardless of the area of specialization. Yet, other researchers have determined that, subject specialization leads to students differing in their attitudes towards computers (Tezci, 2011 and Adebowale et al. 2015). Thus, with no information on the Public teacher training colleges in Machakos county, on this matter, this research explored the influence of subject specialization on the teacher trainees' attitudes toward ICT.

There have been conflicting results about how learners' attitudes toward computers are influenced by gender. While Bebetos and Antoniou (2012) researching in a Greek university and Awofala et al. (2019) in a Nigerian study found the male with better attitudes than the female, for Teo (2011) in a Singapore study and Yusuf (2012) in an investigation in Nigeria, there was no significant difference between the male and female in their attitudes towards ICT. . Finally, for Ariana (2019) in a US study and Diego and Ronny (2023) in a review of studies from 32 nations, the girls were found better than the boys in their Attitudes to computers. Without such data from Public teacher training colleges in Kenya, this investigation was done to determine whether gender affected teacher candidates' attitudes regarding ICT in public teacher training colleges.

Resulting from their studies, researchers have recommended that ICT teachers use guidance and counselling interventions to help change negative attitudes that students have toward ICT (Levine and Donitsa-Schmid 2013, Adebowale et al. 2015 and Kalanda 2015). These interventions include using persuasion and regularly assessing students' ICT attitudes and anxiety levels. They should be anchored in Bandura's social learning theory (1971) and Skinner's operant conditioning theory (1954) both of which support the use of positive reinforcement to modify undesirable behavior. In order to explain the situation in Public Teacher training colleges in Kenya, this study examined the interventions given to teacher trainees to promote positive attitudes toward ICT through a questionnaire to Teacher Trainees of Machakos county in Kenya to obtain the required data.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The research design and locale of the study, variables of the study, target population, sampling techniques and sample size and research instruments are all presented in this chapter. This chapter also discusses pilot study, validity and reliability, data collection techniques, data analysis techniques and logistical and ethical considerations.

3.2 Research Design

This study used the descriptive survey design because it was the best for the research question. according to Marshall and Rossman (1989) descriptive survey design has advantages for the researcher. It is accurate in measurement, the results can be generalized to a larger population within known limits of error, can be used for rapid statistical analysis and it is easy to administer and manage. Further, Orodho (2005) asserts that the research design used for a study should depend on the question the researcher is attempting to answer. Based on this argument, descriptive survey design was the most suitable for the research endeavour under consideration because this study sought to investigate the attitude of teacher trainees towards ICT and intervention measures taken to promote a positive attitude towards learning ICT in public primary teacher training colleges in Machakos County in Kenya. Therefore, this study opted for this design as a way of collecting first-hand data from respondents by administering questionnaires to them in line with the descriptive survey design to accurately capture the computer

attitudes of teacher trainees then formulate rational and sound recommendations for the study.

3.2.1 Research variables

This study explored the teacher trainees' attitude towards ICT as the dependent or main variable. Independent variables of the research included challenges in learning ICT, the trainees' computer experience, subject specialisation in college and guidance and Counselling interventions against bad attitudes, all of which may affect the teacher trainee's attitude to computers. The intervening variable of the research was gender.

3.2.2 Location of the study

This study was conducted in Machakos county in Kenya, based on the study objectives. It has one Public teacher training college, Machakos Teachers' training college. The study locale was selected for the research because it was the only Public Teacher Training College in the county. Further, it had a lengthy history of training primary school teachers, beginning from 1958. The study locale was also picked because it has a diverse population, sizable student body of 900 students and also admitted teacher trainees from all around the country. As a result, there was probably a national representative enrolment of teacher trainees. Moreover, as part of the Primary Teacher Education curriculum, the institution had been teaching the Information Communications Technology subject, and the college's computer labs were where student-teachers learned and completed practical computer exercises. This study focused on second years enrolled in the P1 course, their computer attitudes and how the various factors impact student engagement and learning of the ICT subject.

3.3 Target Population

The study targeted 900 public primary teacher trainees in Machakos County. However, only second year students were sampled because they had been studying ICT at the PTTC for more than a year and could reply to the questions on the questionnaire to provide an overview of the state of the teaching colleges in relation to their computer attitude. The teacher trainees in question were 400.

3.4 Sampling Techniques and Sample Size Determination

3.4.1 Sampling Techniques

The study used the simple random sampling technique. Five second year streams out of the ten were selected because of the 49% projected sample size of the 400 teacher trainees who were the project's target participants. This provided each stream an equal chance of selection. Then, in order to prevent interference with sample characteristics, each chosen stream was utilized as a whole. The researcher benefited from this random sampling because it allowed them to swiftly build up the sample, saving them time, effort, and money. Each of Machakos ttc streams had Both Science (option A) and Arts (option B) teacher trainees. The participants' gender was also taken into account; half of them were male and half were female.

3.4.2 Sample Size

The sample size was drawn from the table made using the Krejcie & Morgan (1970) formula because it was easy to use. It provides an effective way for deciding the size of sample needed for research because they have a prepared table for determining sample size from any given population. One simply refers to their targeted population figure from

the table to get the already calculated sample size. Therefore, from the 400 college teacher trainees who were the target population 196 of them made up the sample. This involved five streams and represented 49% of the population in this study. Table 3.1 illustrates this.

Table 3.1

The Sample Percentage of Teacher Trainees Against enrolment of Second Years

College	Sample	Enrolment	Percentage
Machakos	196	400	49
Total	196	400	49

3.5 Research Instruments

The study used a composite questionnaire (appendix B) to collect data. The questionnaire consisted of 44 items. This included 21 from the Computer Attitude Scale (CAS, Teo, 2011) and 23 additional items created by the researcher to address the other study objectives. The Student teachers' demographic data, attitudes toward ICT, learning challenges that may be affecting those attitudes, computer experience, self-efficacy in ICT, and intervention strategies to promote teacher trainees' positive attitudes toward ICT were all intended to be elicited by the instrument. Thus, the instrument was divided into five sections.

Based on their demographic data and prior computer knowledge, the teacher trainees were asked to complete seven items in Section A: (1–7) (appendix B). This section comprised of the following details: college code, student's gender, age, subjects' option of study,

prior computer experience, and computing environment. This data was used in the results analysis to determine if there were any significant differences in the teacher trainees' attitudes toward ICT (section B) based on computer experience (objective III), specialization in science or the arts (objective IV), and gender (objective V).

The focus of Section B's Item 8–28 (Objective I) was on the attitudes towards ICT among teacher trainees. The students' attitude was elicited in response to the CAS, as described by Teo (2011). However, item 9 was somewhat altered by the researcher eliminating the word "better" to make the statement more concise. In addition, since the trainees were enrolled in a college, the word "school" in items 15 and 19 were changed to the term "college".

The CAS consists of 21 items that examine the four aspects of computer attitudes. Six items in the "Affect" component—items 8, 12, 16, 20, 24, and 27—measured a person's feelings or preferences for computers. The five measures that made up "Perceived Usefulness"—items 9, 13, 17, 21*, and 25—considered the respondent's perceptions of the value of computers in their line of work. Six factors made up the "perceived control" scale and were used to gauge how comfortable or challenged an individual felt using computers: 10, 14, 18, 22, 26 and 28 are the items. The four measures that made up "Behavioural Intention"—items 11*, 15*, 19*, and 23—were used to calculate a person's behavioural intentions and deeds in relation to computers. On a summative five-point scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree) and 5 (strongly agree) the sampled teacher trainees reacted to the CAS. To determine overall scores for each CAS

component, the scores from each item of each component were added. In order to allow for meaningful analysis at the sub-scale level, negative items were given a star and were scored in the opposite manner (Teo, 2011).

Section C included challenges of learning ICT affecting the attitude of teacher trainees to computers (items 29–33). Using common item building guidelines, the researcher created items 29 through 33. They covered trainees' challenges affecting the learning of ICT in college. Therefore, trainee teachers were required to express their judgment on the quantity, access and adequacy of college computers for teaching and learning. In addition, their views were sought on computer practice time and whether the machines were used for teaching other courses, and whether the non-testing of ICT in the Primary Teacher Education national exam discourages the study of the subject in college. 'Yes' and 'No' were used as alternate replies to score the responses for this section. For each choice, the section's findings were provided as percentages.

Section D comprised of Teacher trainees' self-efficacy in using computers (objective II, item 34). This section was included in the teacher trainees' challenges in learning ICT. Teo's (2011) item asking about the teacher trainees' confidence level with utilizing ICT was used, and it asked for the student's assessment of that confidence level. This section also used Likert scale to measure the level of confidence among the participants. The indicators of the Likert scale ranged from 1 "no confidence at all", to 5 "very confident".

Section E was made up of the guidance and counselling interventions used to encourage teacher trainees to have a positive attitude towards ICT (objective VI, items 35–44). The teacher trainees were required to reply to questions in this section regarding the methods employed to foster a positive attitude toward ICT among the student-teachers. For this section, alternate Yes and no answers were utilized to score, and the outcomes were then presented in percentages for each response.

3.6 Pilot Study

The pilot study was carried out to check whether the research tools matched the study objectives and research questions. Additionally, it was done to determine how long it would take to complete the survey questionnaire. Also, it made it possible for the researcher to spot discrepancies, ambiguities and misinterpretations of the research instruments. One public teacher training college was purposively selected for a pilot study. The public primary teacher training college and participants who were selected for a pilot study were excluded from the final investigation. Participants were encouraged to comment and make suggestions geared to improve the various items. The piloting centre shared traits with the college of research. It had slightly more than 400 second-year student-teachers spread across ten streams with an average of 40 students each. The majority of them were studying the arts (option B), with the remaining focusing on the sciences (option A). All were also studying ICT and other core subjects.

3.6.1 Validity of the Instruments

The validity of the study was determined. Validity is the degree to which an indicator or set of indicators designed to measure a notion, accurately captures that concept (Allan & Teevam, 2005). The study used content validity a non-statistical method to validate the contents of the questionnaires as advised by Orodho (2005). Borg and Gall (1989) stated that utilizing the expertise of subject-matter specialists can increase the validity of research instruments. This researcher therefore solicited feedback from knowledgeable supervisors, professors, research professionals, experienced graduates and peers to adjust the instruments to increase its content validity. The views of piloting Participants were also considered in improving the questionnaire items.

3.6.2 Reliability of the Research Instrument

Reliability of the Instruments refers to the consistency of data or results obtained from repeated trials of a research tool (Babbie, 2014). Even when the research tool is used numerous times it produces similar results irrespective of the environment.

the CAS, the major component of this composite study instrument was determined to have great reliability. Teo(2011) proved that the CAS was a trustworthy tool for gauging computing attitude among Singaporean teacher education students. At 0.86, the CAS reliability coefficient was high (Teo, 2011).

The test-retest method was used to measure the reliability of the teacher trainees' questionnaire. during a pilot study which was done in 1 public primary teacher training college. The researcher administered the same instruments twice after two weeks to the

same subjects. The scores from both testing sessions were then correlated to determine their reliability using Pearson Product Moment Correlations Coefficient as indicated.

$$r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2)(N\sum Y^2 - (\sum Y)^2)}}$$

Key:

r = correlation

N= number of pairs of scores

$\sum XY$ = Sum of the products of the paired scores

$\sum X$ = sum of X scores

$\sum Y$ = sum of Y scores

$\sum X^2$ = sum of squared X scores

$\sum Y^2$ = sum of squared Y scores

A correlation coefficient of 0.76 for teacher trainee's questionnaire was obtained.

According to Cohen et al (2012) a reliability coefficient of 0.7 or higher is deemed adequate for a social science research instrument.

The results are shown in Table 3.2.

Table 3.2*Reliability analysis of the Research Instruments*

Instrument	Number of Items	Cronbach's Alpha
Attitude Towards ICT	21	0.79
Challenges of Learning Computers	6	0.76
Interventions to promote positive attitude towards ICT	9	0.74

3.7 Data Collection

A formal introduction letter was written by the researcher to the principal of Machakos TTC to request permission and set up an appointment to gather research data. A study employing a self-administered questionnaire was subsequently used to gather the research data. To fill it out, replies were requested from a sample of Machakos TTC student-teachers. The researcher, an assistant, and the ICT subject instructors at Machakos TTC oversaw the process. After thanking the respondents, the surveys were collected for data analysis.

3.8 Data Analysis

The study used a quantitative approach to analyse the data. The information from the surveys was first coded then processed after keying it into the computer. By employing

the Statistical Package for Social Sciences (SPSS) version 26, descriptive statistics including means, percentages and standard deviations were used to analyse the data. Tables and narratives based on the study's goals summarized the findings.

3.9 Logical and Ethical Considerations

3.9.1 Logistical Considerations

The researcher acquired an authorization letter from Kenyatta University's Graduate School before commencement of data collection. Then he obtained a research permit from the National Council for Science, Technology, and Innovation (NACOSTI) to undertake the study. The research permit and a letter of information were then presented to Machakos County Governor's office, County Commissioner and Director of Education pursuant to rule 3 of the research licence. At the county level, the study was approved by the Machakos County Director of Education. Further, the college principal then gave the go-ahead to use the research instruments on the Machakos TTC trainee teachers after meeting with the researcher.

3.9.2 Ethical Considerations

Several ethical considerations were made in this study in line with social Sciences Research Study norms. The 'informed consent form' (appendix A) provided by the researcher was signed by all teacher trainees taking part in the study as their assent after the purpose of the study was explained to them by the researcher verbally and in an introductory letter. Hence, they were not forced to provide any information. Further, to respect the students' human dignity, the researcher gave them a brief explanation of the study's goals, went over the general guidelines for filling out the questionnaire with them,

stressed the need to select the answers that accurately represented their opinions, and emphasized the necessity of the student-teachers' cooperation in order for the process to be successful. The research questionnaire did not need participant names, protecting the respondents' anonymity, confidentiality, and privacy. Lastly, the data was gathered and used with their permission, therefore, at any time the participants got concerns, they were allowed to withdraw. the researcher assured the participant's anonymity and confidentiality and that the data they provided would be used entirely for this particular research.

To observe copy rights and avoid plagiarism, the researcher acknowledged all the sources of information collected from reviewed journals articles, textbooks, unpublished and published theses as well as other research materials.

CHAPTER FOUR

FINDINGS, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter is divided into the following three parts: an introduction, secondly general and demographic information, and finally, Study findings and interpretation of the results in light of the research objectives.

The study was guided by the following objectives, to: determine the proportions of teacher trainees' having positive attitudes towards ICT and those holding a negative view, assess the challenges influencing teacher trainees' attitudes towards ICT, establish the influence of ICT experience on teacher trainees' attitudes toward ICT, investigate the influence of specialisation in science or arts subjects on teacher trainees' attitudes towards ICT, establish the influence of gender on attitude towards ICT among teacher trainees and to find out the intervention measures used on teacher trainees to promote positive attitudes towards ICT in public primary teacher colleges in Machakos County in Kenya.

4.2 General and Demographic Information

4.2.1 Questionnaire Completion and Return Rate

The study sought to find out the number of questionnaires that were returned after being administered. The findings are as shown in table 4.1

Table 4.1*Questionnaire Completion and Return Rate*

	Questionnaires Issued	Questionnaires Returned	Questionnaires Completed
Number	196	196	164
Percentage	100%	100%	83.7%

Data from table 4.1 reveals that, the return rate of the questionnaires was 100%. Out of this percentage, only 164 (83.7%) of the questionnaires were correctly completed whereas 32 (16.3%) were incomplete. This implies the respondents were cooperative in participating in the study.

4.2.2 Demographic Characteristics of Respondents

Teacher trainees were asked to provide demographic data on a number of different variables for the study. Descriptive statistics from the information gathered from public primary teacher trainees were presented and analyzed. The purpose of this data was to aid the researcher in comprehending the backgrounds of the survey respondents. This was done by asking respondents to fill out questionnaires with information about their age, gender, choice of subject option in college, years of using computers, locations where they had access to computers in college and places where they had first used computers. The demographic information helped the researcher to understand participants he was dealing with in the study. Table 4.2 presents the results of the study.

Table 4.2*Respondents' Demographic Characteristics Summary*

Variable	Description	F	%
Gender	Female	126	64.3
	Male	70	35.7
Age (Years)	Below 20	08	4.1
	21-23	106	54.1
	24+	82	41.8
Selected option in college	Option A	62	31.6
	Option B	132	67.3
	No Response	02	1.0
Years of computer use to process information	Less than 2	74	37.8
	2-6	120	61.2
	No Response	02	1.0
Where you use computers in the institution	Computer Lab	189	96.4
	Classroom	03	1.5
	Other	04	2.0
First place to use computers to process information	Secondary School	88	44.9
	College	50	25.5
	Home	58	29.6

Table 4.2 shows that, there were 126 (64.30%) female and 70 (35.70%) male respondents respectively. This indicates that there were more female TTC participants than male. This suggests that women favour teaching as a profession than men. It could also imply that in most circumstances, males may prefer harder and highly remunerated jobs.

Results also showed that the majority 106 (54.10%) of respondents were between the ages of 20 and 23. This suggests that, young people made up the bulk of the students in public teacher training institutions. The majority of young people at this age had recently finished their secondary schooling and were prepared to begin working. It is also the age at which these young people must practice computer use in order to utilize it in the workplace. The table also reveals that, Option B (Arts) subjects received the majority of responses 132(67.3%) compared to Option A (Sciences) oriented subjects, which received 62 (31.6%). This reveals a preference of the arts for the vast majority of respondents or their ineligibility to choose the science-oriented option.

According to the study findings, the majority of student-teachers, 120 (61.2%) reported using computers for two to six years. This suggests that, they had extensive ICT experience. In addition, 88 (44.9%) of the respondents said that, they first utilized computers to process information while in secondary school. The majority of 189 (96.40%) students who had access to computers in college, did so in the computer lab. This demonstrates that the college computer lab continues to be the primary location for ICT instruction and practice.

4.3 Study Findings and Interpretations

The findings for each of the six objectives of the study are discussed and interpreted in this section.

4.3.1 Proportions of Teacher Trainees with Positive or Negative Attitude towards ICT

The first objective of this study was to determine the proportions of teacher trainees who may have a positive attitude and those who may be holding a negative view of ICT in Machakos County in Kenya. The information in this part was collected to find out whether the respondents had either a positive or negative attitude toward ICT in order to improve performance in the ICT subject in public primary teacher training colleges. The question that was posed was: What are the proportions of teacher trainees' in public teacher training colleges in Machakos County who view ICT positively and those with a negative view? Teacher trainees were to indicate their attitude to ICT by responding to items of the computer attitude scale (cas). The results are presented in Table 4.3.

Table 4.3

Attitude of the Teacher Trainees Towards IC

		Frequency	Percent
	Negative	11	6.7
Valid	Positive	153	93.3
	*No response	32	16.3
Total		196	100.0

The study's findings in table 4.3 indicate that, only 11 (5.6%) respondents had a negative attitude towards information and communication technology compared to 153 (78.1%) respondents who had a positive attitude. This suggests that majority of teacher trainees had a positive attitude towards ICT. However, A few individuals had a pessimistic outlook. These results of a positive attitude corroborate with those of Akram et-al. (2022) According to his study, teachers exhibited positive perceptions regarding technology integration in teaching-learning practices. They believed that technology-incorporated teaching assists them in enhancing their instructional practices effectively, making the learning process exciting and interactive, and keeping learners motivated. Yusuf (2012) also agreed with findings of this study. In relation to the results of the findings, Yusuf (2012) found that, over 50% of informants had a positive opinion of ICT, with only 27.75% of respondents claiming that it would not be valuable to them. Mbwesa (2011) further concurred with the findings of this study. Their study revealed that, the Majority of undergraduate students (85.1%) at the University of Nairobi's Extra Mural Studies Department felt favourably about the online education teaching approach. In similar findings to this study, Osodo et-al. (2010) revealed that, 82% of geography teachers and 69.1% of their students had a positive opinion of using computer technology for simulations in the geography course as well as for teaching and learning. Similar to these findings Opoku and Kuranchie (2014) found that 90% of senior high school students in Ghana had favourable opinions towards the subject. However, the results of this investigation contradicted the findings of Samson (2013) who found that, the majority of teacher trainees (60.5%) showed uncertainty in their attitude and only 39.5% of the trainees had a positive attitude towards ICT.

Table 4.4

Descriptive Statistics for Attitude Towards ICT Scores

	N	Minimum	Maximum	Mean	Std.	Skewness
Attitude Towards	164	47.00	104.00	80.2988	10.78068	-.296

ICT

Valid N (listwise) 164

Results in table 4.4 shows that, the distribution was negatively skewed ($sk = -.296$) and the mean attitude score was high ($M= 80.298$, $SD= 10.78$). The majority of respondents rated themselves highly on the computer attitude scale and had positive attitude towards ICT as indicated by the mean of 80.298. This suggests that most teacher trainees were open to learning about and using computers. Table 4.5 presents these findings in further detail.

Table 4.5*Respondents' Attitude Towards ICT*

	N	Min	Max	Mean	Std.	Skewness	std. Error
8	193	1.00	5.00	4.0155	1.18795	-1.217	.175
9	195	1.00	5.00	4.2564	.99788	-1.666	.174
10	195	1.00	5.00	3.9487	.97253	-1.256	.174
11	193	1.00	5.00	4.2176	1.18774	-1.617	.175
12	191	1.00	5.00	3.8691	1.21336	-1.032	.176
13	194	1.00	5.00	4.3041	1.07022	-1.786	.175
14	186	1.00	5.00	3.9086	1.09408	-1.044	.178
15	191	1.00	5.00	4.3246	1.06592	-1.734	.176
16	187	1.00	5.00	2.4385	1.34812	.558	.178
17	194	1.00	5.00	4.3196	.99268	-1.770	.175
18	194	1.00	5.00	3.8608	.99544	-1.086	.175
19	193	1.00	5.00	3.3057	1.51548	-.313	.175
20	192	1.00	5.00	4.2813	1.06543	-1.738	.175
21	192	1.00	5.00	3.3385	1.46690	-.382	.175
22	192	1.00	5.00	3.6771	1.24904	-.654	.175
23	191	1.00	5.00	3.2251	1.39797	-.315	.176
24	191	1.00	5.00	4.1361	1.13893	-1.502	.176
25	194	1.00	5.00	4.2371	.98983	-1.463	.175
26	192	1.00	5.00	3.4479	1.36040	-.475	.175
27	191	1.00	5.00	3.8115	1.27158	-.898	.176
28	192	1.00	5.00	2.9948	1.41235	.021	.175
Valid N (listwise)	164						

Table 4.5 demonstrates that the respondents were at ease using computers. A HI attitude score for CAS, which indicates a very positive attitude toward ICT, supported this. Tables 4.5.1, 4.5.2, 4.5.3, 4.5.4, and 4.5.5 show that, the scores of teacher trainees for the components of CAS are likewise high.

Table 4.5.1*Affect Domain*

N	Min	Max	Mean	Std.	Skewness	Std Error
193	1.00	5.00	4.0155	1.18795	-1.217	.175
191	1.00	5.00	3.8691	1.21336	-1.032	.176
187	1.00	5.00	2.4385	1.34812	.558	.178
192	1.00	5.00	4.2813	1.06543	-1.738	.175
191	1.00	5.00	4.1361	1.13893	-1.502	.176
191	1.00	5.00	3.8115	1.27158	-.898	.176

Table 4.5.2*Perceived Usefulness*

N	Min	Max	Mean	Std.	Skewness	Std Error
195	1.00	5.00	4.2564	.99788	-1.666	.174
194	1.00	5.00	4.3041	1.07022	-1.786	.175
194	1.00	5.00	4.3196	.99268	-1.770	.175
192	1.00	5.00	3.3385	1.46690	-.382	.175
194	1.00	5.00	4.2371	.98983	-1.463	.175

Table 4.5. 3*Perceived Control*

N	Minimum	Maximum	Mean	Std.	Skewness	
				Deviation		
Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
195	1.00	5.00	3.9487	.97253	-1.256	.174
186	1.00	5.00	3.9086	1.09408	-1.044	.178
194	1.00	5.00	3.8608	.99544	-1.086	.175
192	1.00	5.00	3.6771	1.24904	-.654	.175
192	1.00	5.00	3.4479	1.36040	-.475	.175
192	1.00	5.00	2.9948	1.41235	.021	.175

Table 4.5.4*Behavioural Intention*

N	Min	Max	Mean	Std.	Skewness	
					Statistic	Std. Error
193	1.00	5.00	4.2176	1.18774	-1.617	.175
191	1.00	5.00	4.3246	1.06592	-1.734	.176
193	1.00	5.00	3.3057	1.51548	-.313	.175
191	1.00	5.00	3.2251	1.39797	-.315	.176

Table 4.6*Descriptive Analysis of Domains of Attitude Towards Computers*

Domains	N	Min	Max	Mean	Std	Skewness	Std Error
Behavioural Intention Score	186	5.00	20.00	15.09	3.35	-.548	.178
Perceived Usefulness Score	190	5.00	25.00	20.53	3.29	-1.058	.176
Perceived Control Score	181	7.00	30.00	21.97	4.12	-.265	.181
Valid (listwise)	178	9.00	30.00	22.59	3.87	-.738	.182

In table 4.6, The respondents rated themselves highly in the four domains of CAS as shown by the negative values of the coefficient of skewness. The affect component had the highest mean score (M=22.59, SD = 3.87). The next three components were "perceived control" (M=21.97, SD = 4.12), "perceived usefulness" (M=20.53, SD =3.29), and "behavioural intention," which had the lowest mean score (M=15.09, SD=3.35).

These findings imply that for Machakos TTC respondents', attitudes regarding computers and their perception of control over them were more positive compared to the intentions they had about computers and their usefulness where They expressed less optimism.

The pre-service teachers in Teo's Singapore study gave the "affect" and "behavioural intention" components their highest mean ratings (mean = 4.00). 'Perceived usefulness' came next (mean = 3.98), and 'Perceived control' (mean = 3.54) came last. According to these findings, respondents were more favourable about their preferences for and the way they intended to use computers, but less so regarding their perceptions of the technologies "perceived control" how comfortable or challenged they felt using computers and "perceived usefulness" or their value of computers in their line of work. In conclusion, the determination of the teacher trainee's scores on the various domains of the CAS, the kind of attitudes, and the percentages of student-teachers with either a positive or negative attitude were made.

4.3 Challenges Affecting Teacher Trainees' Attitude and Learning of ICT in Teacher Training Colleges

The second objective of this study was to assess the challenges influencing teacher trainees' learning and attitude towards ICT, in Machakos County in Kenya. The question posed was: Which challenges impact teacher trainees' attitudes towards learning of ICT in public teacher training colleges in Machakos County in Kenya? The teacher trainees indicated their perceived difficulties with the institution's ICT studies by selecting between the two possible "Yes" or "No" responses. The findings were as shown in table 4.7.

Table 4.7*Teacher Trainees Challenges in Learning ICT*

Challenge	Yes		No		No response	
	F	%	F	%	F	%
There are enough computers to use in learning ICT in college	76	38.8	118	60.2	2	1
There is enough time for practicing computers in college.	57	29.1	138	70.4	1	0.5
There are adequate computers in the laboratory to handle programs taught in the computer subject	114	58.2	80	40.8	2	1
Teachers use computers and projectors from time to time to teach us other subjects.	71	36.2	124	63.3	1	0.5
Lack of PTE ICT examination discourages learning of ICT in TTCs.	145	74	50	25.5	1	0.5

The results in table 4.7 Indicated the challenges faced by teacher trainees in their attitude and learning of ICT. 74%) reported that the non-testing of ICT in the national PTE exam was the biggest discouragement from learning ICT. The other challenges revealed were inadequate time to practice ICT (70.4%, inadequate modelling by teachers on computer use in teaching (60.2%), insufficient number of computers for use in the computer lab, (60.2%). However, computers in the laboratory were adequate to handle programs taught in the computer subject for 58.2% of the teacher trainees.

Other researchers have also established barriers in the learning of ICT which affect attitudes to the technology. In Pakistan, Akram et-al. (2022) established the main obstacles hindering teachers from effective integration of ICT into their teaching practices were the slow speed of the internet, load shedding, lack of infrastructure, online teaching experience and inadequate training. Aminuddin et-al. (2022) study in Afghanistan found that, although the participants held positive perceptions in terms of the use of ICT in learning the English language at Takhar University, barriers to the use of ICT including internet/Wi-Fi, electricity, technological devices, ICT infrastructure, time and confidence in using ICT, sufficient training and support existed.

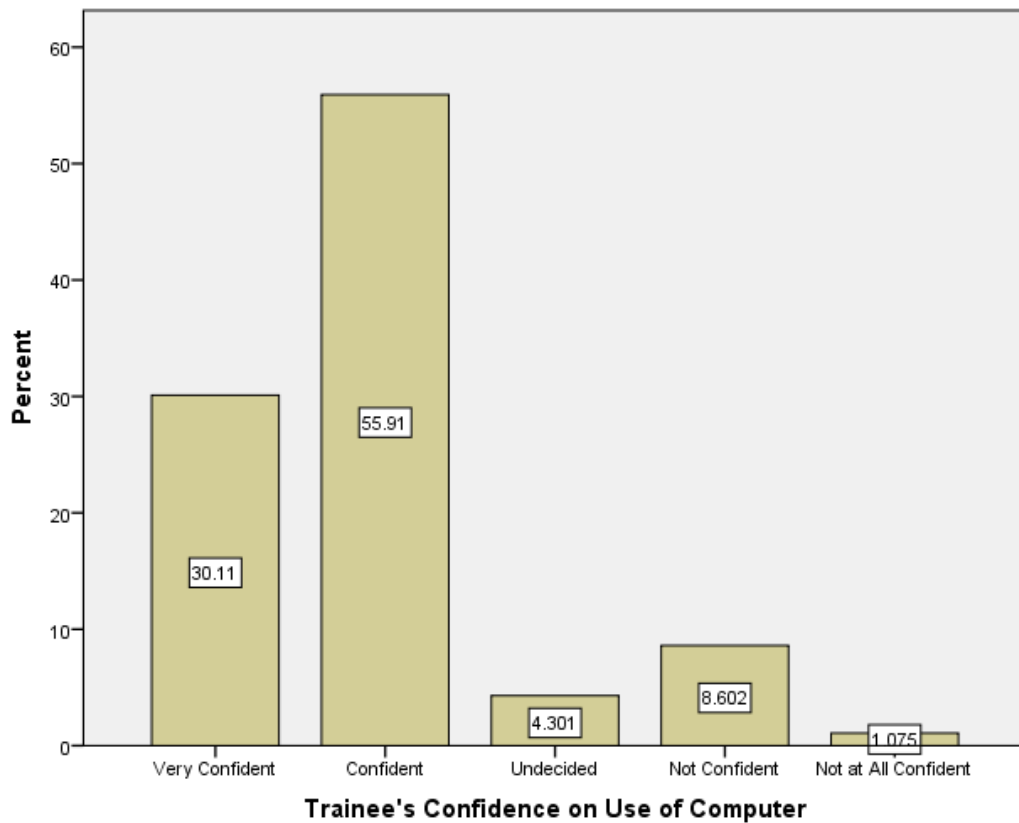
In Africa, the findings of this study are further supported by those of Abdallah et al. (2021) who revealed that, lack of ICT infrastructure, high cost of computers and other technologies, poor internet connectivity, intermittent power fluctuations, and teachers' inadequate knowledge or technical know-how in using ICT tools in teaching were the challenges associated with the integration of ICT/computers in education in Ghana. Maruti (2010) study in Kenya cited time as a major challenge of learning ICT. The study revealed that students had a maximum of two hours per week per class to use the computer labs. According to the study, this was not enough time for sufficient machine practice. Where teacher trainees have little or no access to computer resources, they may find learning the subject difficult and thus, not like it. computer adequacy and computer speed were not a challenge to teacher trainees' attitude towards learning of ICT in Public teacher colleges in Machakos county, Kenya. These findings contradict those of Yusuf (2012) who reported that, the poor status of the ICT infrastructure had discouraged

56.28% of undergraduate student-teachers in the Nigerian research from utilizing ICT. Maruti (2010) also contradict the findings of this study. According to Maruti (2010) 56% of the students expressed agreement that the college computers were inadequate for them and that majority had slow speeds for the classes.

The participants of the study were also asked to indicate their level of self-efficacy as another challenge. Their responses were as shown in figure 4.2.

Figure 4.2

Teacher Trainee's Self-Efficacy on use of Computers



Results in figure 4.2 shows that, 80% of respondents said they were "confident" or "very confident", compared to 20% who said they were "undecided", "not confident", or "not at all confident". This demonstrates the high level of computer self-efficacy among the teacher trainees. Additionally, 78.1% of all respondents to the survey had a positive opinion toward information and communications technology, while 5.6% had a negative attitude. Therefore, this study found that the student-teachers had both high computer efficacy and a positive attitude toward ICT. This suggests a close connection between a high level of positive attitude and good computer self-efficacy. These findings agree with those of Yalcinalp (2015) who found that, in determining the students' attitudes toward computers their self-efficacy was crucial. Further, a study by Adebowale et al. (2015) supports the findings of this study. The study found that, the self-efficacy of students and their subject of study were significant determinants of students' attitudes toward computers in Nigeria.

Considering the challenges stated and the trainee's responses, lack of ICT examination in the PTE national exams was the difficulty with the greatest impact, while the shortage of computers in the lab for teaching and learning was the challenge with the least impact. As a result, the goal ii question was resolved.

4.3 Teacher Trainees' Computer Experience and Attitude towards ICT

The third objective of the study was to determine how much computer experience affects teacher trainees' attitudes toward ICT. This was accomplished by comparing the length of computer experience of distinct trainee groups to their attitude toward computers, either positive or negative. The student-teachers specified how long they had been using

computers by selecting either less than two years or two to six years. The details are shown in table 4.9.

Table 4.8

Teacher Trainees' Computer Experience and Attitude Towards ICT

		Type of attitude Towards ICT			Total
			Negative	Positive	
Years using Computers	Less than 2	Count	6	53	59
		% of Total	3.7	32.3	36.0
	2-6	Count	5	99	104
		% of Total	3.0	60.4	63.4
	No Response	Count	0	01	01
		% of Total	0.0	0.6	0.6
Total		Count	11	153	164
		% of Total	6.7%	93.3%	100.0%

According to the findings in table 4.8, 60.4% of respondents with positive attitudes had used computers for two to six years or more, compared to 32.3% of respondents with positive attitudes who had used computers for less than two years. This demonstrates that, trainees' overall computer attitude be it positive or negative, is considerably influenced by the length of their computer experience.

This was supported by Fisher (2011), who discovered that about 86% of student-teachers enrolled in introductory courses in education at Marquette University in Midwest USA with previous experience in computer software applications had more positive attitudes towards computers compared to the novice group who had computer phobia. According to Teo (2011) the duration of utilising ICT was positively connected with computer confidence and a favourable attitude. Respondents had a positive attitude to computers which they had used on average for 9.63 years ($SD=3.27$).

Levine & Donitsa-Schmidt (2013) in Israel found that computer expertise had a favourable impact on computer confidence and attitudes. Yusuf (2012) study found that students had positive attitudes towards computers in Nigeria. Over 60% of them stated that they acquired their computer knowledge and skills outside of the classroom through personal training, family, and friends. This happened because the ICT program at the university was both too general and inadequate to meet their needs (Yusuf, 2012). The study findings were supported by the research by Wambiri and Ndani (2016) who found that, younger teachers, those 40 years and less, had more positive attitudes and beliefs about the value of computers than older teachers did. This was because, in contrast to the older teachers, the younger teachers had been trained on ICT while in college and had additional practice using computers or associated devices on a regular basis. The results of this study suggest that younger teachers had a more positive opinion of ICT than older teachers because they had more experience with computers and related technologies. Table 4.13 provides data on the mean attitude Score in relation to computer experience.

Table 4.9*Mean Attitude Score and Years of Using Computers*

	Years using Computers	N	Mean	Std. Deviation
Attitude Score	Less than 2	59	76.2881	10.10301
	2-6	104	82.6538	10.53406

The findings in table 4.9 showed that respondents with between 2 and 6 years of computer use had a more positive attitude toward using ICT on average (M= 82.65, SD= 10.53) than respondents with less than 2 years of experience (M= 76.28, SD= 10.10). Table 4.14 displays the results of an Independent Samples t-test on the same.

Table 4.10*Independent Samples t-test on the Mean Score for Computer Experience*

		Levene's Test for Variances		T-Test Means		
		F	Sig.	t	df	Sig.(2 tailed
Attitude Score	Equal variances assumed	.000	.994	-3.762	161	.000
	Equal variances not assumed			-3.806	124.86 1	.000

Based on years of computer experience in table 4.10, there were significant differences in the means of attitudes toward ICT ($t=-3.76$, $df=161$, $p 0.05$). The responders with more years of computer experience benefited from this disparity. This provided evidence that the attitudes of teacher trainees towards ICT varied significantly according to their prior computer experience and provided a response to the question of whether prior computer experience affects student-teachers attitudes toward ICT.

2.5 Influence of Subject Specialization on Attitude Towards ICT

The fourth objective of the study was determining how much student-teachers' computer attitudes are influenced by their specialisation in the arts or sciences. In relation to the question, the attitude scores of respondents with a specialisation in science (Option A) and those with a specialisation in the arts (Option B) were compared. The findings are represented in table 4.10.

Table 4.11

Specialization in College and type of Attitude Towards ICT

Category of students	Negative		Positive		Total	
	N	%	N	%	N	%
Option A	7	4.3	50	30.5	57	34.8
Option B	4	2.4	101	61.6	105	64.0
No Response	0	0.0	2	1.2	2	1.2
Total	11	6.7	153	93.3	164	100

In regard to these findings in table 4.11, the arts (option B) was selected by majority of respondents (61.6%) with a positive attitude, while sciences (option A) was selected by just 30.5% of those interviewees. This result might be explained by the vast majority of respondents to the survey who belonged to option B compared to those in option A. Additionally, the mean attitude Scores in regard to College Specialization groups have to be taken into account. The findings are shown in table 4.11.

Table 4.12*Mean Attitude Score and Specialization in College*

	Option in College	N	Mean	Std. Mean	Error Mean
Score of Attitude	Option A	57	79.3860	11.04173	1.46251
	Option B	105	80.6095	10.59344	1.03381

Table 4.12 reveals that in comparison to respondents from the sciences (option A) (M= 79.38, SD=11.04), respondents from the arts (option B) exhibited a higher mean attitude toward ICT (M= 80.61, SD=10.59). The two mean scores for area of specialization, as given in table 4.11, were contrasted using samples of t-test.

Table 4.13*Attitudes Based on the Area of Specialization*

		Levine's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude score	Equal variances assumed	.03	.86	-6.92	160	.490
	Equal variances not assumed			-6.83	111.020	.496

According to the findings in table 4.13, there were no appreciable mean variations in computer attitude depending on their field of specialisation, (t=-6.92, df=160, p > 0.05).

A consideration of the mean attitude scores and an t-test on the mean scores for area of Specialization showed no significant mean differences in attitude towards ICT, even though 61.6% of the respondents with positive attitudes toward ICT belonged to option B compared to 30.5% of those with favourable attitudes from option A. This might be the result of the teacher trainees receiving the same ICT instruction from the same lecturers whether they chose the science or the arts option. This study proved that there was no discernible difference between option A and option B teacher trainees' attitudes toward ICT. These results correlate with those of Teo who did a study in Singapore among pre-service teachers obtaining post-graduate certifications in education. The findings of the study revealed that, in spite of some students specializing in either the humanities, sciences or languages, he discovered that participants in the secondary pre-service teaching program had comparable computer attitudes.

These findings, however, contradict the findings of Tezci et al. (2011) who found that students specializing in various areas of study can have distinct attitudes about computers. When compared to students in social sciences, science, and art departments, students in Turkey's language teaching and computer education departments were shown to have more favourable opinions to ICT and the internet in the survey which involved 1898 pre-service teachers from 18 Turkish Universities. These findings also agree with those of Adebowale et al. (2015) Who conducted a survey study on students' attitudes toward ICT, computer self-efficacy and anxiety. 600 senior secondary 3 (SS III) students from six schools in the Nigerian state of Lagos were chosen for the study using a proportionate sampling method. Analysis showed that the study field had a major impact on

participants' perceptions of computers and degree of computer self-efficacy. Consequently, students studying vocational disciplines had the best attitudes toward computers, followed by those studying commercial subjects, who also showed more positive attitudes than those studying science and the arts.

4.6 Gender Influences on Teacher trainees' Attitude Towards ICT

The investigation of how much gender influences teacher trainees' attitudes toward ICT was the fifth objective of the study. To address the issue, the researcher compared the scores for attitude of the female responders to those of the male participants. Table 4.14 shows a comparison between the two.

Table 4.14

Gender and Attitude Towards ICT

Gender of Respondents	Type of attitude towards ICT				Total	
	Negative		Positive		N	%
	N	%	N	%		
Female	7	4.3	65.2	100	61.0	10
Male	4	2.4	34.8	53	32.3	57
Total	11	6.7	100	153	93.3	164

Results in table 4.14 show that, the majority of respondents (61.0%) with a positive attitude were female, as opposed to the respondents who were male (32.3%). As a result, there were more females than males with a favourable attitude. This may be explained by the fact that there were more female respondents 126 (64.3%) in than male respondents

70 (35.7%). The findings in table 4.13 provides information on the mean attitude score in regard to the gender of respondents.

Table 4.15

Mean attitude Score and Gender of the Respondents

	Gender of Respondents	N	Mean	Std. Deviation	Std. Error Mean
Attitude Score	Female	107	80.5794	10.74405	1.03867
	Male	57	79.7719	10.92510	1.44706

According to table 4.15, in comparison to male respondents (M= 79.77, SD=10.92), female respondents showed a marginally more positive mean attitude toward ICT (M= 80.57, SD=10.74). The mean score for females was compared to that of the male using an Independent Samples t-test, as shown in table 4.16.

Table 4.16*t-test for Gender Differences*

		Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude score	Equal variance assumed	.002	.966	-.456	162	.649
	Equal variance not assumed			-.453	112.755	.651

In table 4.16, Regarding the implications of differences in attitudes toward ICT across the genders of respondents, there were none that were statistically significant ($t=-.456$, $df=162$, $p > 0.05$). These findings are in agreement with those of Teo (2011) who found that there were no gender differences in attitudes toward information and communication technology among Singaporean student-teachers in the education field. Kalanda (2015) in Lesotho, Dlodlo (2014,) in Zimbabwe and Awofala et al. (2019) in Nigeria got similar findings.

On the contrary, some researchers have found differences in attitudes about ICT between genders. For some, the male have better computer attitudes than the female. In a study at a university in Greece among physical education students who used computers often, Bebetos and Antoniou (2012) found statistically evident gender disparities in computer attitude between the male and female. According to the results, computers were more

appealing to and useful to the male than to the female. Awofala et al. (2019), explored attitudes towards computers, gender and computer anxiety as determinants of computer self-efficacy. The survey was among 2100 pre-service science, technology and mathematics (STM) teachers from the University of Lagos in Nigeria. They found statistically significant gender differences in computer attitudes between the male and female. The male had significantly higher computer attitude scores ($M=48.04$, $SD=4.57$) compared to the female ($M=46.29$, $SD= 4.33$). These two

Yet for others the female had better computer attitudes than the male. Diego and Ronny (2023) study found that, girls outperform boys in digital knowledge and skills ($\beta = -0.11$ to -0.29), Ariana (2019) study also found significant differences in ICT attitudes across gender with female students more positive regardless of how comfortable they were in using computers and the internet, and across technology comfort levels with those more comfortable, regardless of gender, being more positive toward ICT use in English language learning.

4.7 Intervention Measures Offered to Promote Teacher Trainees' Positive

Attitudes Towards ICT

The sixth objective of the study focused on investigating the intervention measures used in the institution to support teacher trainees' good computer attitudes. Teacher trainees either chose "Yes" or "No" as their response. The findings of the results are displayed in Table 4.18.

Table 4.17

Intervention Measures Offered to Promote Teacher Trainees' Positive Attitudes Towards ICT

Intervention measure	Yes		No		No response	
	F	%	F	%	F	%
The ICT teacher strives to identify trainees who may not like ICT.	112	57.1	80	40.8	4	2
For difficult ICT learning tasks, the teacher helps individuals to work from the simplest to the most complex tasks	173	88.3	18	19.2	5	2.6
The teacher gives immediate feedback to the learner on task performance, to encourage them learn challenging ICT skills.	153	78.1	37	18.9	6	3.1
For difficult ICT learning tasks, the teacher breaks them in to small manageable steps and patiently repeats the directions.	162	82.1	31	15.8	4	2
The teacher uses reinforcement to encourage positive behaviour change for a learner with ICT learning difficulties.	156	79.6	37	18.9	3	1.5
The teacher praises successful learners of ICT tasks to encourage those with difficulties to put in more effort and attention.	145	74	47	24	4	2

The ICT teacher consistently persuades trainees that ICT is necessary, enjoyable and manageable.	174	88.8	19	9.7	3	1.5
The teacher uses teacher trainees who enjoy learning ICT to motivate classmates with negative attitudes to the subject	129	65.8	59	30.1	8	4.1
The teacher requires the trainee to repeat the instructions given and implement them by performing computer tasks successfully.	151	77	37	18.9	8	4.1
Trainees who enjoy ICT are used to lead learning discussions so that those with negative attitude can emulate them.	131	66.8	57	29.1	8	4.1

Results in table 4.17 shows that, the majority (88.8%) of the respondents revealed that, the most frequently employed attitude intervention measure was teachers of technology continually persuading their students that the computer subject is designed for them and that they can study, enjoy, and excel in this field. This agrees with the findings by Kalanda's (2015) suggestion that, ICT teachers should continually remind students that they can learn, like, and pass the subject and that it is beneficial to them. This should be done to help individuals gain self-confidence in their ability to learn ICT (Kalanda 2015). Adebowale et al. (2015) concurred with the notion but insisted that school counsellors and vocational guidance specialists carry out this task in order to help students gain confidence and overcome technology-related anxieties.

The following strategies listed in order of popularity were also used: assisting learners handling challenging ICT learning tasks by guiding them from the easy to complex tasks (88.3%). This is consistent with Skinner's (1954) recommendation that learning activities be broken down into manageable increments so the teacher can reward each tiny step the learner takes to come closer to the objective. Moreover, to automatically reinforce the learner, the learning material should also be carefully constructed. Breaking difficult tasks to manageable steps and patiently repeating the directions (82.1%) according to Skinner this should be done as many times as possible.

The use of reward to promote positive behaviour change for students with ICT learning problems was addressed and scored 79.6%. Skinner (1954) and Bandura (1971) both advocate using positive reinforcement anytime the desired behaviour is displayed. For Skinner, however, should have it scheduled. (Skinner, 1954). According to Bandura, individual learning is promoted through direct reinforcement, rewards, and vicarious reinforcement (Bandura, 1971). These findings also agree with those of Kinyanjui et al., (2015) who found that teachers in the primary schools in Kenya used social reinforcement strategies such as praise, warmth, attention, feedback, approval, concern, recognition for exemplary work and empathy on their learners. This made learning easier for pupils. 78.1% of the viewed that providing instant feedback to motivate students to pick up difficult ICT skills as in intervention measure. According to Skinner (1954), when activities are broken down into little steps, the teacher's instant feedback will reinforce each small step the student takes toward completing the objective task. According to Bandura (1971), effective feedback will corroborate the learner's observations, and

correction will boost their performance, learning, and enjoyment creating an environment that fosters intrinsic motivation. 77% concurred that teacher trainees were required to repeat instructions and put them into practice by carrying out assigned computer tasks. According to Bandura, this will result from the guided participation process, in which a live model will exhibit desired behaviour and provide verbal instructions on how to perform something. The learner will then be required to follow the instructions by repeating them and completing the activities (Bandura, 1971).

Publicly commending successful computer task performers to spur effort and focus from learners who are struggling scored 74%. This was reinforced by Bandura's social learning theory, which holds that behaviour can be learned or acquired directly through personal experiences or indirectly through seeing other people's actions and the results that follow (Bandura, 1971). 66.8% agreed that, using trainees enjoying ICT to lead learning discussions for imitation by individuals with negative attitudes and 65.8% said that employing trainees enjoying ICT to inspire classmates with negative views was used as an intervention measure.

These supports Bandura's theory that modelling behaviour was important because most people copy many of the behaviours exhibited by their role models (Bandura, 1971). Attempting to pinpoint students who do not enjoy ICT 57.1%, scored least as an intervention measure. Levine and Donitsa-Schmidt (2013) made the suggestion that the teachers regularly assess their students' attitudes toward computers, their level of anxiety, and their confidence in using computers. They also suggested that the teacher look into

the causes of each student's bad computer attitude in order to suggest an appropriate intervention for each of them. for more than 50% of the teacher trainees they were aware that to combat unfavourable attitude and encourage teacher trainees' positive computer attitudes in college, teachers of ICT used all of the suggested guidance and counselling intervention measures. Because of how well it had worked, 78.1%) of the teacher trainees now had the necessary positive attitude toward computers. However, more than 40% of the teacher trainees were unaware of the efforts made by the ICT tutors to identify candidates who would not enjoy ICT. Those who have a negative opinion on ICT are included in this group. Whatever interventions were made, they weren't aimed towards the people who needed them, in their eyes. The issue stated in objective vi was dealt with.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter has three sections. It begins with a summary of the findings of this study, then the conclusions arising from the study and finally, there are recommendations on policy and for future research.

5.2 Summary of the findings

The purpose of this study was to explore the attitude of teacher trainees towards ICT and intervention measures taken to promote a positive attitude towards computers. Further, it investigated whether computer learning challenges, computer experience, subject specialization in college and gender influence teacher trainees' attitudes to computers. It targeted teacher trainees in public primary teacher training colleges in Machakos County in Kenya

The first objective of the study was to find out the proportions of teacher trainees with good attitudes and those with negative attitudes toward ICT. The overwhelming majority of teacher trainees were found to have a positive attitude towards ICT, while only a minimal portion had a negative view. Additionally, the majority of respondents had good ratings on the Computer attitude scale.

The second objective of the study was to assess the challenges influencing teacher trainees' learning and attitudes towards ICT in teacher training colleges. For the majority, the most significant challenge discouraging the learning of ICT in TTCs was due to the absence of a national PTE examination for the subject. The next challenges in order were little time to practice ICT, insufficient instructor modelling of computer use for teaching and few computers for use in the laboratory. However, the computers in the lab were adequate for teaching the computer subject and the vast majority of respondents (also expressed a high degree of computer self-efficacy.

The third objective was to find out if the student teachers' attitudes toward ICT were influenced by their prior computer experience. The findings indicated that, trainees' extensive computer experience led to their positive computer attitude. In comparison to the respondents with favourable attitudes from the group of respondents with less than two years of experience, nearly two thirds of the respondents with positive attitudes had used computers between two and six years.

The study's fourth objective was to investigate whether teacher trainees' opinions about ICT were influenced by their specialization in either the arts or sciences. this exploration found no significant difference in the means of computer attitude between option A and option B teacher trainees,

For the fifth objective, the researcher was to establish whether there were gender differences in attitudes towards ICT among teacher trainees in college. There were no

significant mean differences in attitude towards ICT based on respondents' gender that were established.

The study's sixth objective entailed investigating the intervention strategies used in class to encourage teacher trainees' positive attitudes toward ICT. The most often intervention measure (88.8%) employed by teachers of ICT was to continually persuade trainees that learning computers was desirable, interesting, manageable and intended for them. Other intervention measures used by ICT teachers: encouraging their students to progress from easy to difficult ICT learning tasks (88.3%), splitting up difficult tasks into manageable steps and patiently repeating the directions for execution (82.1%), using reinforcement to encourage positive behaviour change for students experiencing computer learning problems (79.6%), providing instant feedback to students to encourage them to learn demanding ICT skills (78.1%), requiring a trainee to repeat instructions and put them into practice while carrying out assigned computer tasks (77%), acclaiming successful learners of ICT tasks to encourage effort and attention from learners with negative attitude (74%), using trainees enjoying ICT to lead learning discussions for imitation by those having negative attitude (66.8%), using trainees enjoying ICT to motivate peers having negative attitudes to the subject (65.8%), and, finally, striving to identify trainees who may not like ICT (57.1%),

5.3 Conclusions

Based on the fore discussed summary of the findings, the study came up with the following conclusions. A Minimal number of teacher trainees in Machakos county in Kenya have developed a negative attitude towards ICT in spite of learning the subject for

more than a year. This means that such trainees are losing out on the gains of learning ICT for them. This may also interfere with the promotion of integration of ICT in the teaching and learning for their future learners that they teach. Therefore, their negative attitude must be given more attention by their teachers.

In addition, the lack of a national PTE exam in the field of ICT discouraged teacher trainees from learning the subject in TTCs, which contributed to their negative attitudes toward the technology. This implies that introducing a national examination for the subject will make those with negative attitudes to computers take the subject more seriously and begin to develop more positive attitudes to ICT.

While the results indicate that for the majority the trainees' length of computer experience contributed to their positive attitude toward computers, clearly for those with a negative attitude towards ICT it has not. This is because their computer use did not produce good feelings for them. Therefore, serious attention from the college on insufficiency of time and computers for ICT practice and inadequate modelling of ICT use by teachers are required to contribute to the development of positive attitudes for this group.

Among teacher trainees their specialization in the sciences or the arts and gender had no bearing on attitudes toward ICT. That is a desirable thing that results from equal attention being given to all student-teachers of both gender and subject specializations. That practice should be continued.

Although the majority of trainee teachers are aware of the positive attitude promotion intervention measure of the teachers identifying and attending to those with bad attitudes to ICT, the people who need them most are not aware of its use. Those who have a negative opinion on ICT are included in this group. This calls for deliberately targeting of each individual with a negative attitude to ICT to achieve the positive attitude required.

5.4 Recommendations

The findings of the current study led to the following recommendations on policy and future research.

5.4.1 Policy Recommendations

Based on aforementioned conclusions, the study made the following policy recommendations.

- i. The ministry of Education should ensure that the ICT subject is one of the examinable subjects for the national Primary Teacher Education course. This will encourage all trainees in TTCs to learn ICT more seriously than before.
- ii. In order to realize the policy of the government to make Kenya a knowledge-based economy by 2030 and developing an ICT literate workforce, tutors of ICT should pay more attention to the minority of teacher trainees who develop a negative attitude towards ICT. This is due to the fact that the teacher trainees with a negative attitude towards ICT compromise the promising gains of learning ICT for them and the promotion of integration of ICT in the teaching and learning for their future learners.
- iii. To build up practical Computer self-efficacy for all teacher trainees, there should be more time for practicing ICT by Equipping the laboratory with more

computers, opening the computer laboratory even during prep times and equipping other facilities like classes and library with ICT for practice and accessing information.

- iv. Teachers of ICT and other subjects in college should implement education policies emphasizing ICT integration in teaching to serve as models to teacher trainees in proper computer use in curriculum delivery.
- v. The ICT teacher should deliberately seek out each learner with negative attitude towards ICT and investigate the source of the unfavourable view for each of them so that they can target suitable guidance and counselling interventions for each individual.
- vi. The Ministry of Education should sensitize ICT teachers on how to deliberately utilize the behavior modification techniques in guidance and counselling to prevent the development of the negative student-teachers' attitude towards computers in good time to ensure they do not lose the opportunity to learn and enjoy ICT and use it for the benefit of their future learners.
- vii. The Ministry of Education should also conduct in-service training courses through workshops and seminars to inform teachers of computer about relevant developments in ICT and the best methods of teaching the technology to promote a positive attitude and ICT integration in college and schools.

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APPENDICES

Appendix A: INFORMED CONSENT FORM

Dear Respondent,

I am John M. Kilonzo, a student of Kenyatta University currently pursuing a Master of Education degree (Guidance and Counselling). As part of the requirement for the award of the degree, I am conducting a research on the following topic:

Attitude towards Information and Communications Technology and intervention among Primary Teacher Trainees in Machakos County, Kenya.

You have been selected to participate in the study as a respondent and I have therefore attached a questionnaire for you to answer. As a participant you have the freedom to participate/or withdraw at whatever stage of the study if you feel that this research will cause any form of physical, emotional or psychological harm. The information given will be treated with utmost privacy and confidentiality.

Please answer all the questions as honestly as possible to facilitate the successful completion of the study. The information received shall only be used for the intended academic purpose. Your cooperation will be highly appreciated. Thanks in advance.

If you agree to participate in this research study, please sign on this form.

Signature:.....

Date:.....

Appendix B:RESEARCH INSTRUMENT

Teacher Trainees' Questionnaire on Attitude towards ICT and Challenges in Learning ICT

Guidelines on how to give your responses

I am humbly requesting you to kindly answer all questions as honestly and precisely as possible. The information you give will be kept confidential and will only be used for research purposes.

1. This questionnaire mainly requests you to kindly describe your Information and Communications Technology subject experiences by choosing statements indicating your level of agreement.
2. Please note that this is not a test. Your opinion is what is required and therefore, it is the right answer.
3. Please respond to all questions on this questionnaire.
4. For this research study “Information and Communications Technology (ICT)” will mean college desktop computers or laptops
5. Please do not write your name on this questionnaire. This will make your answers anonymous and confidential
6. In this Questionnaire you will find 43 items or statements (item 2-44. For each question or statement, tick one response or number corresponding to your answer or opinion.

For example:

Strongly disagree SD	Disagree D	Neutral N	Agree A	Strongly Agree SA
1	2	3	4	5

14. I can make the computer do what I want it to do.

A. If you think you strongly agree with the statement, tick the 5.

B. If you think you strongly disagree with the statement, tick the 1.

C. Or you can choose either number 2 or 3 or 4 if any of the statements seems like a more accurate answer for you

D. If you want to change your answer, cross it out then tick a new number,

e.g.: 1 2 3 ~~✓~~ 4 5✓

SECTION A: Teacher Trainees' Questionnaire on Attitudes towards ICT and Challenges and Interventions in Learning ICT

1. College Code

For the following items, please tick (✓) appropriately

2. What is your gender?

Female Male

3. How old are you?

20 or below 21-23 24 or above

4. What is your selected option in college?

Option A Option B

5. How many years have you been using computers to process information?

Less than 2 years More than 2 years but less than 6 years

6. Where do you use computers in your institution?

Computer lab classroom Library Other (state)

7. Where did you first use computers to process information?

In secondary school In college At home

SECTION B

Items 8-28 are a series of statements designed to enable you to indicate the extent to which you agree or disagree with the ideas expressed. Please tick (✓) what you agree with.

	SD	D	N	A	SA
8. If given the opportunity to use a computer, I am afraid that I may damage it in some way.	1	2	3	4	5
9. Computers help me improve my work.					
10. I could probably teach myself most of the things I need to know about computers.					
11. I would avoid taking a job if I knew it involved working with computers.					
12. I hesitate to use a computer for fear of making mistakes I cannot correct.					
13. Computers make it possible to work more productively.					
14. I can make a computer do what I want it to do.					
15. I avoid coming in to contact with computers in college.					
16. I don't feel apprehensive about using a computer.					
17. Computers can enable me to do more interesting and imaginative work.					
18. If I get problems using the computer, I can usually solve them one way or another.					
19. I only use computers at college when I am told to.					
20. Computers make me feel uncomfortable.					
21. Most things a Computer can be used for I can do as well myself.					
22. I am not in complete control when I use a Computer.					

23. I will use computers regularly throughout college.					
24. Using a computer does not scare me at all.					
25. Computers can enhance the presentation of my work to a degree which justifies the extra effort					
26. I need an experienced person nearby when I use a computer.					
27. I hesitate to use a computer in case I look stupid.					
28. I do not need someone to tell me the best way to use a computer.					

Section C: Challenges of Learning Computers in the Primary Teacher Training Colleges.

For items 29-33 please tick (√) what applies

29 There are enough computers to use in learning ICT in college

Yes () No ()

30 There is enough time for practicing computers in college.

Yes () No ()

31 The computers in the laboratory are adequate to handle programs taught in the computer subject.

Yes () No ()

32 Teachers use computers and projectors from time to time to teach us other subjects.

Yes () No ()

33 Lack of PTE ICT examination discourages learning of ICT in TTCs.

Yes () No ()

SECTION D:

Teacher trainee ICT Confidence

Tick (√) what applies to you regarding your self-efficacy on ICT use

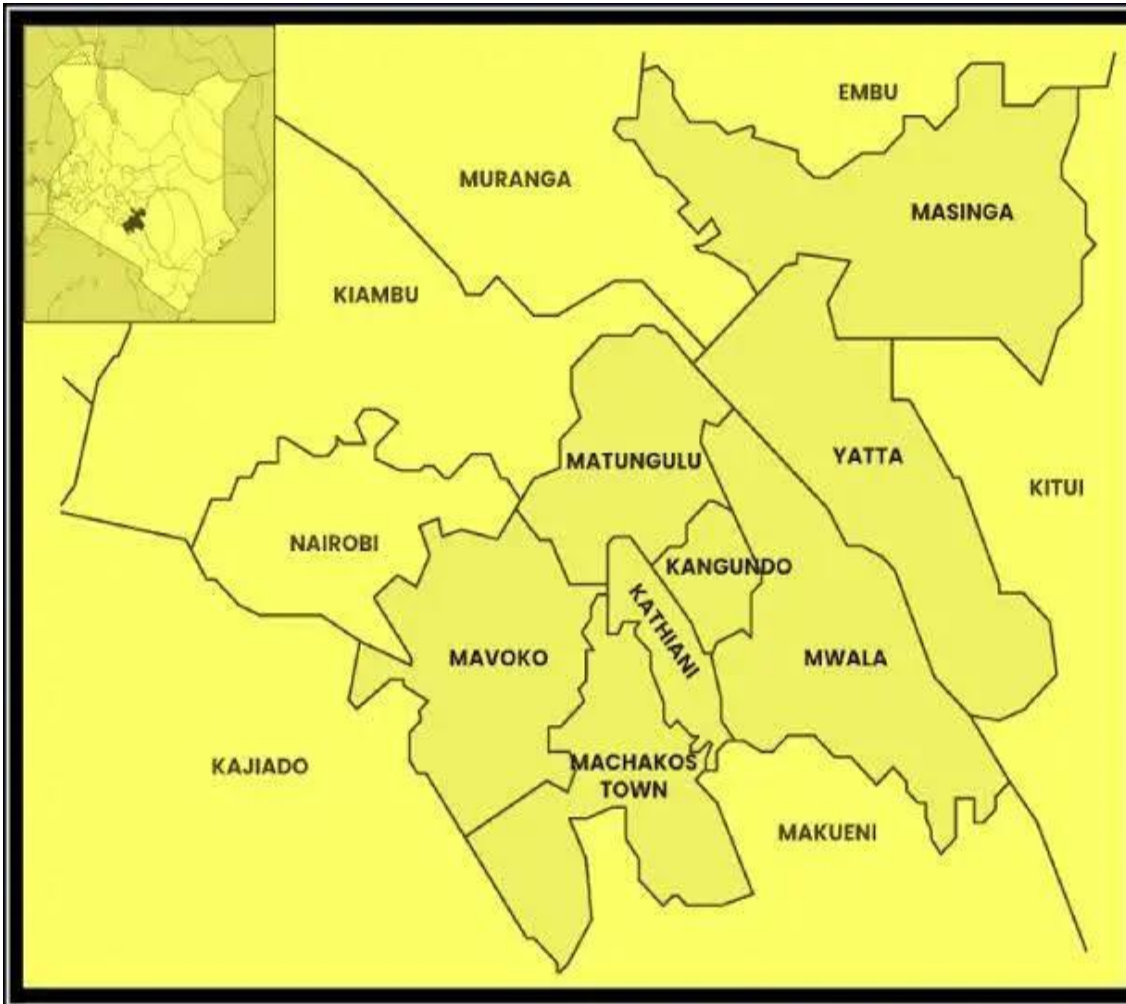
S/ NO	ITEM	Very confident	Confident	Undecided	Not confident	Not at all confident
34	How confident are you in using the computer?					

SECTION E: Interventions to promote teacher trainees' positive attitude towards

ICT (Tick (√) what applies)

- 35** The ICT teacher strives to identify trainees who may not like ICT. Yes ()
No ()
- 36** For difficult ICT learning tasks, the teacher helps individuals Yes () No ()
- 37** The teacher gives immediate feedback to the learner on task performance, to encourage them learn challenging ICT skills. Yes () No ()
- 38** For difficult ICT learning tasks, the teacher breaks them in to small manageable steps and patiently repeats the directions. Yes () No ()
- 39** The teacher uses reinforcement to encourage positive behavior change for a learner with ICT learning difficulties. Yes () No ()
- 40** The teacher praises successful learners of ICT tasks to encourage those with difficulties to put in more effort and attention. Yes () No ()
- 41** The ICT teacher consistently persuades trainees that ICT is necessary, enjoyable and manageable Yes () No ()
- 42** The teacher uses teacher trainees who enjoy learning ICT to motivate classmates with negative attitudes to the subject Yes () No ()
- 43** The teacher requires the trainee to repeat the instructions given and implement them by performing computer tasks successfully. Yes () No ()
- 44** Trainees who enjoy ICT are used to lead learning discussions so that those with negative attitude can emulate them. Yes () No ()

Appendix C: Map of Machackos County



Appendix D: Permission to Collect Data(Graduate school)



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Website: www.ku.ac.ke

Internal Memo

FROM: Dean, Graduate School

DATE: 12th October, 2020

TO: Kilonzo J. Musyimi
C/o Education Psychology Dept.

REF: E55/OL/16018/2006

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 11th September, 2020 approved your Research Project Proposal for the M.ED. Education Psychology Degree Entitled, "Attitude Towards Information and Communications Technology and Intervention Among Primary School Teachers Trainees in Machakos County, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.

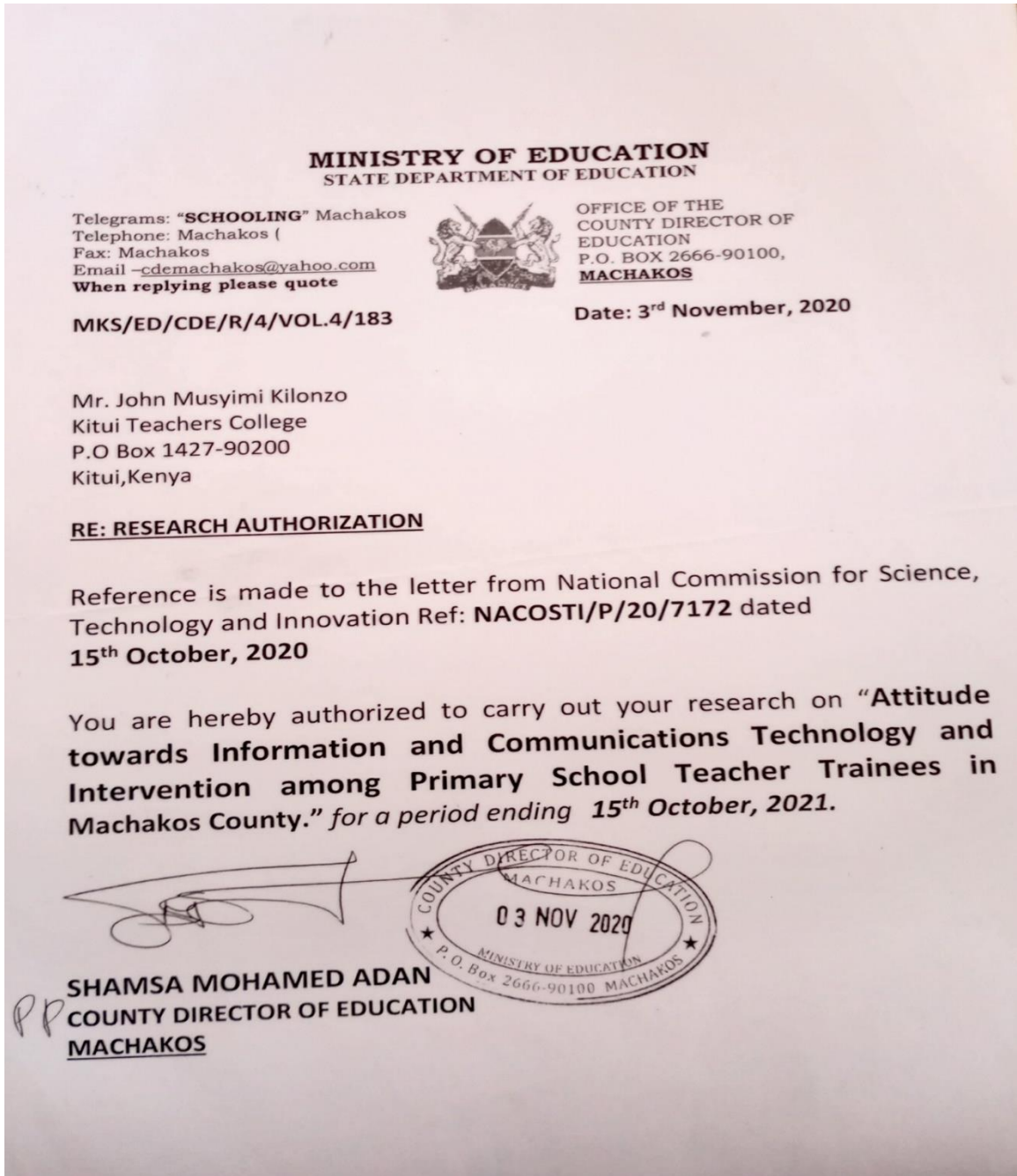
ELIJAH MUTUA,
FOR DEAN, GRADUATE SCHOOL

C.C.: Chairman, Education Psychology Department.

Supervisor:

I. Dr. Prof. T. Kinai
C/o Department of Education Psychology

Appendix E: Authorization to collect data(County director of education)



Appendix F: Research Permit

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 570485 Date of Issue: 15/October/2020

RESEARCH LICENSE

This is to Certify that Mr.. John Musyimi Kilonzo of Kenyatta University, has been licensed to conduct research in Machakos on the topic: **ATTITUDE TOWARDS INFORMATION AND COMMUNICATIONS TECHNOLOGY AND INTERVENTION AMONG PRIMARY SCHOOL TEACHER TRAINEES IN MACHAKOS COUNTY, KENYA** for the period ending : 15/October/2021.

| I .

License No: NACOSTI/P/20/7172

570485

Applicant Identification Number Director General

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

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