

**INFLUENCE OF TEACHER-RELATED FACTORS ON INTEGRATION OF
INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING IN
PUBLIC SECONDARY SCHOOLS IN NAIVASHA SUB-COUNTY, NAKURU COUNTY,
KENYA**

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Abstract

One of the challenges in the twenty-first century is the inclusion of technology into educational methods. Providing computers and connecting to the Internet is far easier than properly incorporating ICT into the educational process. The study sought to determine how ICT integration in teaching was influenced by teachers' ICT literacy and perceptions on ICT integration in teaching in public secondary schools in Naivasha Sub-County, Nakuru County, Kenya. The study focused on the Technological Pedagogical Content Knowledge (TPACK) Model for Technology Integration in Teaching. The study used a descriptive survey research approach. A total of 607 instructors from 39 public secondary schools participated in the survey. A stratified sample, purposeful sampling, and simple random sampling were used to select the study's 242 teachers. A questionnaire distributed to teachers was used to collect data. Pilot testing was conducted in the nearby Kinangop Sub County. The data were analyzed using both descriptive and inferential statistics. According to the survey results, instructors had a normal distribution of teachers' perception and a moderate degree of ICT literacy. They also had a good view on ICT integration. The study's independent variables explained 31.7% of the variation in ICT integration in the classroom ($R^2 = 0.317$). Teachers' perception ($\beta = 0.277$, $t(225) = 3.901$, $p < 0.05$) and ICT literacy ($\beta = 0.430$, $t(225) = 8.305$, $p < 0.05$) were significant predictors of ICT integration. The findings are expected to have a major impact on how the government assesses the National ICT Policy on Education and Digital Learning Programme, which was ostensibly developed to integrate information and communication technology (ICT) into secondary education in Kenya. The research recommends that in order to provide teachers with the ICT skills and knowledge they need, the Ministry of Education and Teachers Service Commission hold regular professional development seminars and workshops.

Keywords: *Literacy, Perception, Integration of ICT, Teaching, Secondary Schools*

INTRODUCTION

The advancement of information and communication technology (ICT) is critical in today's society, and it has become a global resolution (Mohammed & Abdulghani, 2017). ICT use

includes sending an email, watching television, and using Cloud Tools such as WhatsApp, Facebook, and Google Classroom. According to Ghavifekr, Rezek, Ghani, Meixi, and Tengyue (2019), ICT is a catch-all term that encompasses software, computer networks, satellite communications, and associated systems that enable users to generate, analyze, access, and use information, data, and knowledge in a number of ways. Information and communication technology is employed in a multitude of ways in today's society. Incorporating ICT into the teaching and learning processes in schools has a tremendous impact on the learners' future. To generate and grow a large number of informed high school graduates, school management, instructors, and students must be well-versed in ICT to tackle the changing culture of teaching and learning abilities necessary for 21st-century education (Chai, Tan, Deng, & Koh, 2017, and Gokstin & Kurt, 2017).

Information and communication technology integration has enhanced teaching and learning processes, according to Malero, Ismail, and Manyilizu (2015). ICT engages learners, fosters teamwork, and gives access to a range of information among Tanzanian high school pupils. As education evolves, technological innovation has led to the inclusion of ICT in secondary schools. ICT integration in education has far exceeded any human anticipation, and so ICT is no longer a novel concept. ICT policy, financing, professional development, ICT infrastructures, skills, and knowledge are all factors influencing ICT integration in Indonesian Pre-service Teacher Integration Programs (PTTPs), according to Goktas Yildirim and Yildirim (2017). In order to empower students in the twenty-first century, the UNESCO ICT Competency Framework for Teachers (CFT) recognizes the importance of incorporating ICT into education (Sutter & Kihara, 2019).

According to some assessments, other nations in Europe, Asia, and North America are also leading the way in adopting ICT to modernize their economy. The incorporation of ICT into the classroom is seen as a critical pillar in Singapore's education system; consequently, the usage of ICTs by school administrators, instructors, and students serves as the basis of Singapore's education system (Lee, Kim, and Lee 2015). An extensive study on ICT and education has proved the relevance of learning about ICT and how it can be utilized successfully to strengthen the new technology in teaching and learning (Bai, Wang & Chai, 2019; Hoyles, 2018; Rana, Greenwood, Fox-Turnbull, and Wise, 2018; Rana et al., 2019).

The Kenyan government is placing a strong emphasis on the use of ICT in teaching and learning at both the elementary and secondary levels, working in conjunction with international organizations and agencies like UNESCO. The 2006 review of ICT strategy was motivated by the need to match the policy with Kenya's new constitutional dispensation and Vision 2030. To help the country achieve its 2030 objective, the government will develop a network of world-class technical training schools. As a consequence, every Kenyan citizen will have computer literacy and will be able to participate in the digital economy. As a consequence, the government will integrate ICT subjects into the curriculum at all levels of education, as well as build and implement a national e-education system to support schools (Ministry of ICT; 2019). Kenya's government established a laptop initiative for 1.2 million elementary school children in 2013 (Wanzala & Nyamai, 2018). The aim of the initiative was to incorporate ICT into school-based teaching and learning. Wanzala and Nyamai (2018) revealed, however, that due to the high cost of laptops, the policy moved from laptops to tablets during the roll-out of the one laptop per kid initiative in 2016. Approximately 19000 of the 23951 public elementary schools have received tablets by July 2018 (Wanzala & Nyamai; 2018, Abuya, 2019).

Although some public schools getting ICT-related resources through digital literacy efforts, only a handful of them were employing ICT tools to improve teaching and learning, according to research conducted by the Kenya Institute of Curriculum Development (KICD). Teachers' reluctance to include ICT into the teaching and learning process could be explained in part by their lack of the necessary abilities. Regardless of the introduction of ICT in education, teachers in developing countries are reportedly reluctant to use technology in teaching and learning (Adebayo & Fagbohun; 2013, Kafyulilo, Fisser, Pieteus & Voogt, 2015; Sulemana, Anyanful & Abudulai; 2018, Sutter & Kihara, 2019). Computers are commonly employed in educational institutions for teaching administration and basic ICT skills rather than as tools for delivering instruction (Anyanful & Abdulai, 2018). According to Kafyulilo et al. (2015), instructors' resistance to integrating technology into their lesson plans is due to their limited ICT knowledge and experience. The government has made significant investments in ICT-related teaching and learning materials, yet student performance in KCSE exams has consistently been poor, especially in science (KNEC reports, 2018).

Statement of the Problem

The use of ICT in secondary school instruction is rather low, despite the efforts made by the Kenyan government to raise the value of education (Mwunda, 2014). The fundamental obstacles to effectively implementing a new information system in education, according to Ajzen (2005), are a lack of user acceptability and pessimistic views regarding ICT integration in the classroom. It is becoming more and more important to integrate information and communication technology (ICT) into education in today's quickly changing digital environment. The successful integration of ICT in educational contexts is hampered by a number of issues, though. Insufficient infrastructure and resources are among the main issues. Many educational institutions lack the computers and internet connection needed to properly incorporate ICT into their curricula. This restricts the options for students to improve their learning through technology and makes it more difficult for teachers to use it in the classroom. In addition, instructors do not receive the necessary training or assistance to use ICT in the classroom efficiently. Many instructors struggle to stay up to date with the newest tools and software because they feel overwhelmed by the speed at which technology is advancing. Teachers might not be able to properly utilize ICT to improve their teaching methods if they do not have the necessary training and assistance. In the end, this has an impact on students' educational experiences and makes it more difficult for them to acquire the digital skills required to succeed in the workforce of the twenty-first century. Teachers also face difficulties due to the absence of regulations and guidelines regarding the efficient use of ICT in the classroom. In the absence of well-defined guidelines and strategies, teachers could find it difficult to harmonize their pedagogical approaches with the objectives of ICT integration. Lack of a unified framework for ICT integration might cause uneven implementation in educational institutions and reduce technology's overall ability to enhance teaching and learning. The development of comprehensive policies and provision of requisite resources and support for the successful integration of ICT in teaching necessitate collaboration among policymakers, educators, and stakeholders in order to address these challenges and optimize the potential of ICT in education. Nevertheless, very little is known about the relevant elements that teachers have influence over the incorporation of ICT in the classroom. To determine how these factors influence the incorporation of ICT into teaching, more study is required as it is unclear if secondary school teachers in Naivasha Sub-County possess the necessary pedagogical skills.

Research Objectives

- i. To determine the influence of teachers' ICT literacy on ICT integration in teaching in Naivasha Sub-County public secondary schools.
- ii. To examine the influence of teachers' perceptions on ICT integration in teaching in Naivasha Sub-County public secondary schools.

Hypothesis of the Study

HO₁: The use of ICT in teaching in public secondary schools in Naivasha Sub-County is not statistically significantly impacted by teachers' ICT literacy.

HO₂: In public secondary schools in Naivasha Sub-County, teachers' perceptions have no statistically significant impact on how ICT is integrated into teaching.

LITERATURE REVIEW

Empirical Studies Review

Information and communication technology (ICT) use in education has been accompanied by an increase in studies on how technology influences students' motivation, performance, and engagement (Christopoulos et al., 2018). Numerous initiatives (Mayer, 2019; Zhu & Urhahne, 2018) stress the importance of helping school administrators and instructors organize accessible online instructional materials. Second-order barriers, like teachers' views, confidence, attitudes, and talents, may also be important in determining effective technology integration in schools, even though first-order obstacles like funding, equipment, technical help, and training are crucial (Inan & Lowther, 2010). Nevertheless, very little study, particularly on the second category of obstacles, has been done (Ghavifekr et al., 2016; Scherer et al., 2019), and even less research has been done recently (Francom, 2020).

According to Bhattacharjee and Deb (2016), teachers must be able to rethink how they set up their learning environments in order to successfully integrate ICT into their classroom instruction. An absence of technological understanding as a result limits a teacher's creativity and confidence in using technology in the classroom. Furthermore, according to Kamaruddin, Abdulla, Idris, and Nawi (2017), instructors must be adept at using technology and have control over it in order for them to incorporate it into lesson plans and comprehend how important it is for teaching and learning. Innwoo and Moluayonge (2017) investigated how instructors used ICT in secondary schools in Cameroon. Data from 320 teachers were gathered for the study. According to the report, Cameroon's secondary schools only sometimes employ ICT for teaching and learning because of a lack of ICT infrastructure. In addition, the survey found that teachers had poor training and confidence, had little access to materials that were accessible, and obtained insufficient ICT support while integrating ICT in their classes.

According to studies (Michael et al., 2016), instructors think ICT enhances learning. Twelve secondary schools in Nairobi County utilized a descriptive survey method to examine the benefits and drawbacks of adopting ICT in teaching and learning. The study's findings indicate that teachers have a variety of difficult tasks ahead of them, including developing their technical expertise and self-training in ICT use in the classroom (Amuko, 2015).

One aspect that affects how ICT is used in the classroom is the teacher's perception. Cultivating a positive outlook is crucial when integrating ICT into the classroom. Muslem, Yusuf, and Juliana (2018) investigated the attitudes towards and barriers to ICT use among Indonesian English teachers. 26 instructors were selected for the study's questionnaire and interview using a purposeful sampling method. The study's findings revealed that the participating instructors had positive attitudes toward the use of ICT in classroom instruction and learning. According to Buliva (2018), who conducted a study on teachers' impressions of the usefulness of ICT in

schools in Vihiga County, Western Kenya, this finding may be due to the younger instructors. The study examined if there were statistically significant differences between male and female teachers using a suitable sample of county teachers and the gender variable. An independent samples t-test revealed no statistically significant differences in the average ratings of male and female teachers. According to the poll, there was no statistically significant gender difference in County teacher opinions on computer use.

Theoretical Framework

The Technological Pedagogical Content Knowledge (TPACK) framework, lead this project (Mishra & Koehler, 2008). TPACK, according to Mishra and Koehler (2008), is a way of considering the knowledge that teachers need in order to effectively incorporate technology into their lectures, such as computer literacy and subject matter. Teachers who display strong ICT practices, according to proponents, are imaginative and adaptive, and they devise techniques to manage the TPACK framework's constraints, affordances, and interconnections. Three elements are necessary for successful education, according to Mishra and Koehler (2006): technology, pedagogy, and content, as well as the interaction between and among them known as TPACK. They continue by stating that TPACK is broken into seven sections. All three types of knowledge are required: Knowledge of technology (TK), pedagogical knowledge (PK), and content knowledge (CK). The interaction of the three components leads in pedagogical content knowledge (PCK), technical content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK). The seven components combine to form TPACK (Technological Pedagogical and Content Knowledge), according to Thompson and Mishra (2007-2008). (2008) Koehler and Mishra expanded the approach by including context, suggesting that context significantly affects how technology is employed in the teaching process. Although the context is frequently disregarded in TPACK studies, Koh, Chai, and Tay (2014) claim that this makes the framework applicable to a range of situations.

Conceptual Framework

The relationship between the dependent variable (ICT integration in teaching) and the independent variables (teacher-related factors influencing ICT integration in teaching) is illustrated by the study's conceptual framework.

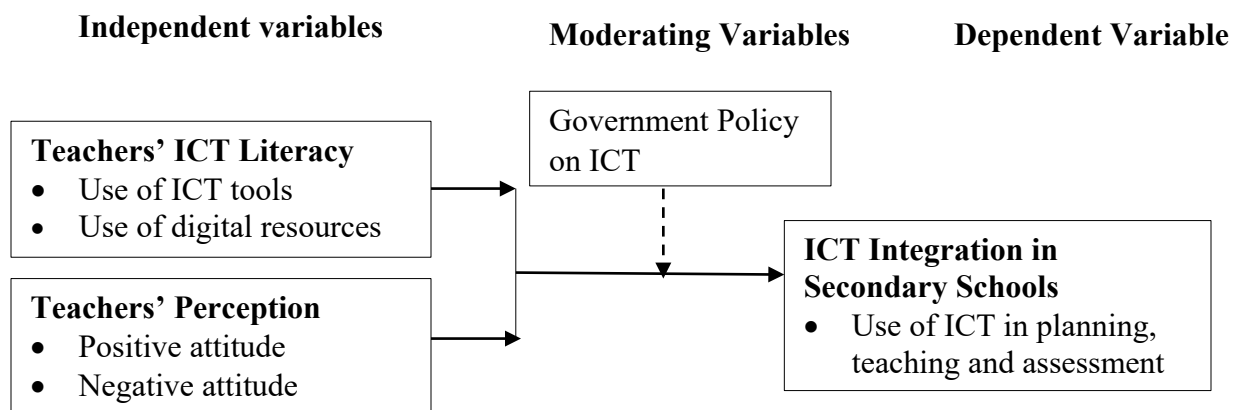


Figure 1: Conceptual framework

The two independent variables are shown in Figure 1 as having a relevant and proportionate impact on the effects of ICT integration in teaching in public secondary schools in Naivasha Sub County. In other words, it will be possible to forecast how ICT integration in teaching will be impacted by the instructors' ICT literacy, viewpoints, and teaching experience. The theoretical

framework of the study TPACK affected the conceptual framework. Complete ICT integration in education is possible when technology knowledge is effectively integrated with content and pedagogical knowledge and the current settings are taken into account.

METHODOLOGY

The study used a descriptive survey approach to evaluate teacher-related factors influencing ICT integration in the lesson in Naivasha Sub-County, Nakuru County. Data was acquired using a mixed method that combines quantitative and qualitative methods. The study took place in Naivasha Sub County, Nakuru County. All public secondary schools were targeted in this study since they are government-supported and hence have identical ICT facilities. The number of teachers in Naivasha Sub-County was 607. The teaching staff samples were chosen via stratified sampling, purposive sampling, random simple sampling, and the school where the respondents were chosen, from each of the four zones in the Naivasha Sub-county. The sample size was established using the Yamane formula.

$$\frac{N}{1 + Ne^2}$$

Where n= sample size, N= Population size and e= Margin of error.

Yamane (2000) proposes that a population of 607 teachers' yields a sample of 242, which was proportionately allocated to sampled schools and percentages computed. A questionnaire was employed in the present investigation. Pilot testing was carried out to assess the validity and reliability of the research tools. Both descriptive and inferential approaches were utilized to assess the acquired data about the study's objectives. To ascertain the relationship between the dependent and independent variables, the regression formula was used: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$. The researcher made sure that all pertinent ethical issues were taken into account including Confidentiality and Privacy, Anonymity, Informed Consent and Voluntary Participation.

FINDINGS AND DISCUSSION

Response Rate

The study distributed 242 questionnaires to respondents in each of the four zones of the sampled schools in Naivasha Sub-County. The response rate was 93.38% since 226 of the 242 questionnaires were completed and returned. This high response rate was made possible through persistent follow-up with responders. A response rate of 50% is regarded as satisfactory, a rate of 60% as good, and anything beyond 70% as very good, according to Mugenda & Mugenda (2008).

Teachers' ICT Literacy on ICT Integration in Teaching

The ICT literacy of teachers was assessed by having them respond to questions from Morales' (2013) ICT literacy survey. Table 1 displays the replies of the tested teachers, together with their frequency distribution, percentages, means, and standard deviations (SD).

Table 1: Teachers' ICT Literacy and ICT Integration

Statement	N	1	2	3	4	5	Mean	Std. Dev
I am proficient in using basic ICT tools such as Word processing, PowerPoint and Spreadsheet.	226	28	58	91	37	12	2.77	1.038
		12.4%	25.7%	40.3%	16.4%	5.3%		

I am confident in troubleshooting minor ICT issues that arise during teaching.	226	59 26.1%	75 33.2%	51 22.6%	23 10.2%	18 8.0%	2.41	1.205
I possess advanced skills in using educational software and digital learning platforms.	226	25 11.1%	42 18.6%	59 26.1%	52 23.0%	48 21.2%	3.25	1.286
My ICT skills enable me to effectively integrate technology into various subject areas.	226	38 16.8%	36 15.9%	54 23.9%	58 25.7%	40 17.7%	3.12	1.338
I regularly seek out new ICT tools and strategies to enhance my teaching.	226	94 41.6%	62 27.4%	40 17.7%	14 6.2%	16 7.1%	2.10	1.214
I can adapt ICT tools to meet the diverse learning needs of my students.	226	44 19.5%	64 28.3%	68 30.1%	25 11.1%	25 11.1%	2.66	1.227
I am aware of current trends and developments in educational technology.	226	39 17.3%	60 26.5%	25 28.8%	26 11.5%	36 15.9%	2.82	1.298
I am able to assess the effectiveness of ICT integration in improving student learning outcomes.	226	34 15.0%	56 24.8%	52 23.0%	45 19.9%	39 17.3%	3.00	1.322
I actively collaborate with colleagues to share ICT integration best practices.	226	63 27.9%	65 28.8%	60 26.5%	17 7.5%	21 9.3%	2.42	1.231
I believe that enhancing my ICT literacy positively impacts student engagement and achievement.	226	18 8.0%	44 19.5%	75 33.2%	52 23.0%	37 16.4%	3.20	1.167
Mean		19.50%	24.87%	27.22%	15.45%	12.96%	2.78	1.233

Source: Teachers' Questionnaire

As per the information gathered from the participants, 21.7% expressed agreement or strong agreement that they had the ability to use fundamental ICT tools including Word Processing, PowerPoint, and Spreadsheet. Forty-three percent said they were neither in agreement nor disagreement. There were 25.7% of respondents who disagreed and 12.4% who strongly disagreed. The majority of respondents expressed lack of confidence in their ability to solve small ICT difficulties that may develop during teaching. Eight percent of the respondents who took part in the study overall strongly agreed that they had confidence in their ability to solve small ICT difficulties. A little over 10.2% of respondents agreed with the assertion, 22.6% were undecided, and 33.2% and 26.1% strongly disagreed, suggesting that they could need help troubleshooting small ICT difficulties that come up when teaching.

The study found that 21.2% of participating teachers strongly believed that they have advanced skills in using digital platforms and educational software in their teaching. Twenty-three percent agreed, while 26.1% were unsure. The percentages of respondents who disagreed and strongly

disagreed were 18.6% and 11.1%, respectively. The majority of respondents agreed or strongly agreed that their knowledge of ICT allow them to successfully integrate ICT into their teaching. In addition to 17.7% strongly agreeing, at least 25.7% of respondents agreed. Twenty-three percent did not agree or disagree. Merely 15.9% and 16.8% of respondents, respectively, disagreed or strongly disagreed.

Rapid technological advancement frequently results in fresh tools with improved functionality, usability, and educational objectives. Maintaining current means that your teaching strategies will always be applicable and efficient. Students of today are accustomed to utilizing technology on a daily basis; they are digital natives. Of all respondents, 41.6% strongly disagreed and 27.4% disagreed with the assertion that they often look for new ICT tools and techniques to improve teaching. A total of 17.7% expressed no opinion. The percentages of respondents who agreed and strongly agreed with the statement were 6.2% and 7.1%, respectively. They assist students in gaining the digital literacy skills necessary for their future education and employment by using modern technology into their teaching strategies. All students, even those with special education requirements, can benefit from the capabilities that new technologies frequently offer, which can accommodate varying learning styles and demands. Additionally, learning new ICT techniques and tools makes one more motivated and self-assured in their teaching practice, which advances their own professional development.

According to survey data, 19.5% and 28.3% of participants, strongly disagreed and disagreed respectively, with the assertion that they adapt ICT tools to accommodate students' varied learning requirements. Thirty percent were neutral, while 22.2% agreed or strongly agreed with the statement. Adapting ICT technologies enables one to personalize learning experiences to the specific needs of each learner. This individualized approach allows students to study at their own speed, focus on areas for improvement, and explore interests that drive them. Similarly, adapting ICT technologies helps to level the playing field, giving all students, regardless of starting place, similar possibilities to achieve. It helps to close gaps that may arise owing to socioeconomic level, language competence, or other factors. When students believe their specific needs are being satisfied, they are more likely to participate actively in class and take charge of what they learn.

For whether teachers were aware of current trends and advancements in educational technology, 15.9% strongly agreed. There were 11.5% who agreed, 26.5% who disagreed, and 17.3% who strongly disagreed. Twenty-eight point eight percent of the respondents did not agree or disagree. Of all the participants in the survey, 17.3% strongly agreed and 19.9% agreed that they can analyze materials for the effectiveness of ICT integration in increasing students' learning outcomes. Those who did not agree or disagree accounted for 23%, while those who disagreed or strongly disagreed comprised 24.8% and 15%, respectively. The major purpose of incorporating ICT into education is to improve learning. By measuring its success, you may establish whether the tools and tactics you're utilizing are genuinely improving student comprehension, retention, and application of information.

According to the survey, 27.9% of respondents strongly disagreed and 28.8% disagreed with the assertion that they actively collaborated with their colleagues to exchange best practices for ICT integration. The percentage of those who were neutral was 26.5%, while only 7.5% agreed and 9.3% strongly agreed with the statement respectively.

According to the survey, 16.4% strongly agreed and 23.0% agreed that enhancing ICT literacy has a beneficial influence on students' involvement and achievement. A minor proportion of

8.0% strongly disagreed, whereas 19.5% disagreed while 33.2% of respondents did not disagree or agree.

This study supports earlier findings about the status of teachers who lacked ICT literacy (Harendita, 2013; Kusumo et al., 2012). It has been observed that today teachers are more literate and eager to include more ICT activities in their lesson plans. The majority of instructors are familiar with a variety of ICT resources and teaching strategies that can be applied in the classroom. They can access the internet to gather information, use ICT tools to improve their instruction, and give their students access to digital resources and ICT materials that are related to the subjects they are teaching.

Teachers' expertise undoubtedly influences their self-efficacy in higher education ICT deployment. Teachers must increase their digital literacy abilities and stay current on technology advances or risk falling behind. Parker (2010) points out the ideal twenty-first-century teaching framework, what knowledge is, what literacy is, and how learning should be. Some teachers' roles will likely be transformed by technology in the future; as a result, instructors must be ICT literate and prepared to educate in the digital era of technology.

Teachers' Perceptions of ICT Teaching Integration

The second objective of the study was to look into teachers' perception of ICT integration in lessons in Naivasha Sub-County public secondary schools. Table 2 demonstrates how teachers' perspectives on factors influencing teacher perceptions were scored using a Likert scale ranging from strongly agree to strongly disagree.

Table 2: Teachers' Perception on ICT Integration

Statement	N	1	2	3	4	5	Mean	Std. Dev
ICT tools enhance the effectiveness of my teaching.	226	1 0.4%	13 5.8%	27 11.9%	102 45.1%	83 36.7%	4.24	0.763
I feel confident using ICT in my teaching practices.	226	5 2.2%	7 3.1%	16 7.1%	89 39.4%	109 48.2%	4.35	0.826
ICT helps me differentiate instruction to meet diverse student needs.	226	6 2.6%	5 2.2%	27 11.8%	95 41.5%	93 41.9%	4.29	0.813
It is important to encourage students to conduct online research on the subjects they are studying.	226	4 1.8%	8 3.5%	24 10.6%	92 40.7%	98 43.4%	4.31	0.801
ICT use in the classroom has a positive influence on students' capacity for higher-order thinking.	226	7 3.1%	7 3.1%	13 5.8%	96 42.5%	103 45.6%	4.31	0.879
ICT facilitates communication of students and their teachers.	226	7 3.1%	13 5.8%	36 15.9%	98 43.4%	72 31.9%	4.12	0.907
For students to be ready to live and work in the twenty-first century, ICT integration in the classroom is essential.	226	1 0.4%	11 4.9%	12 5.3%	78 34.5%	124 54.9%	4.44	0.771
A lot of material may be covered in a short amount of time when ICT is integrated into the class.	226	5 2.2%	7 3.1%	15 7.0%	83 36.2%	116 51.5%	4.39	0.831

I believe ICT is essential for preparing students for future careers.	226	6	12	49	104	55	4.05	0.847
		2.7%	5.3%	21.7%	46.0%	24.3%		
When teaching with ICT integration, students pay more attention.	226	3	6	11	92	114	4.41	0.750
		1.3%	2.7%	4.9%	40.7%	50.4%		
Mean		1.98%	3.95%	10.20%	41.00%	42.88%	4.29	0.819

Source: Teachers' Questionnaire

Table 2 indicates that 45.1% of teachers agreed and 36.7% strongly agreed that ICT tools enhance the effectiveness of teaching. However, 11.9% of respondents were neutral, 5.8% disagreed, and 0.4% strongly disagreed with the assertion. The majority of teachers (48.2%) strongly agreed, and 39.4% agreed, they feel confident using ICT in their teaching practices; however, 7.1% of respondents were neutral to the statement and 5.3% either disagreed or strongly disagreed with the statement. The majority of teachers (83.2%) either strongly agreed or agreed that ICT helps them differentiate instruction to meet diverse student needs. According to the data collected 11.9% remained neutral while 4.9% of the respondents either disagreed or strongly disagreed.

A large percentage of teachers, or 43.4%, highly agreed with the statement that "It is important to encourage students to conduct online research on the subjects they are studying," followed by 40.7% of those who agreed, 10.6% of those who were neutral, and only 5.3% of those who either strongly opposed or disagreed. For the statement "ICT use in the classroom has a positive influence on students' capacity for higher-order thinking." 45.6% of instructors strongly agreed and 42.5% agreed with the statement while just 6.2% disagreed or strongly disagreed. However, 5.8% of teachers were undecided.

The majority of teachers 43.4% agreed, and 31.9% strongly agreed, that ICT facilitates communication of students and their teachers, while 15.9% were undecided. Those who either disagreed or strongly disagreed accounted for 5.8% and 3.1% respectively. For students to be ready to live and work in the twenty-first century, ICT integration in the classroom is essential, 54.9% of teachers strongly agreed, 34.5% agreed, undecided were 5.3% and strongly disagreed were 4.9% respectively. According to the study, 51.3% of teachers strongly agreed, and 36.7% agreed that when ICT is used in teaching, a lot of content is covered in a short period of time. 6.6% of the teachers chose a neutral response and 5.3% disagreed or strongly disagreed.

Moreover, when ICT integration is implemented in the classroom, 46.0% participants agreed and 24.3% strongly agreed that they believe ICT is essential for preparing students for future careers. On the other hand, 8.0% disagreed or strongly disagreed, while 21.7% were unsure. The study also revealed that 40.7% of respondents agreed and 50.4% strongly agreed that students are more attentive when ICT integration is utilized in teaching. Only 4.0% of respondents disagreed or strongly disagreed, with 4.9% remaining neutral. Most teachers either agreed or agreed strongly with the statements. This demonstrates that the vast majority of instructors felt favorably about using ICT in the classroom.

According to the findings of previous research (Ndibalema, 2014), instructors agree that ICT may be utilized as a pedagogical tool to improve their teaching when enough resources and infrastructure are available. Additionally, a positive perception among teachers about the use of ICT when teaching has been identified as a key component in motivating teachers to do so (Player-Koro, 2012). Teachers who participated in the study had a positive mindset toward the use of ICT in the teaching process. The findings of this study were consistent with those of

previous research. Semerci and Aydn (2018) found that teachers exhibited a high degree of positive perception and low degree of worry toward the use of ICT in education, while Hong (2016) found that instructors who took part in it had a favourable opinion of ICT as a teaching instrument. Although having a positive perception of ICT is one of the variables that contribute to its integration in education, it is not sufficient to integrate ICT into teaching on its own. Adegbenro, Gumbo, and Olakanmi (2017) found that teachers had a favorable opinion of integrating ICT into their lessons. Teachers were eager to learn more about using ICT into the classroom. However, because they lacked the expertise and pedagogical abilities to use ICT effectively, teachers encountered challenges integrating it into their daily activities in the classroom.

Level of ICT Integration in Teaching

Dependent variable in the research investigation was the extent to which teachers integrated ICT into their teaching methods. Table 3 displays the proportion of teacher replies with varying degrees of agreement, as well as the mean and standard deviation.

Table 3: ICT Integration in Teaching

Statement	N	1	2	3	4	5	Mean	Std. Dev
I use ICT tools regularly in my teaching.	226	13 5.8%	74 32.7%	77 34.1%	47 20.8%	54 23.9%	2.90	1.013
Teachers in my school are adequately trained to integrate ICT into their lessons.	226	8 3.5%	20 8.8%	77 34.1%	47 20.8%	15 6.6%	3.48	1.008
ICT is seamlessly integrated into the curriculum across all subjects in my school.	226	6 2.7%	12 5.3%	41 18.1%	103 45.6%	64 28.3%	3.92	0.955
In my school, students have access to up-to-date ICT resources.	226	4 1.8%	19 8.4%	95 42.0%	65 28.8%	43 19.0%	3.55	0.952
In my school assessment methods includes ICT-based tasks.	226	62 27.4%	64 28.3%	57 25.2%	23 10.2%	20 8.8%	2.45	1.240
ICT enhances student engagement and motivation in learning.	226	49 21.7%	70 31.0%	56 24.8%	23 10.2%	28 12.4%	2.61	1.275
There is sufficient technical support available for ICT use in my school.	226	12 5.3%	36 15.9%	89 39.4%	52 23.9%	37 16.4%	3.03	1.409
ICT improves collaboration and communication among students and teachers.	226	49 21.7%	34 15.0%	43 19.0%	61 27.0%	37 16.4%	3.29	1.085
In my school the presence of ICT serves	226	18 8.0%	51 22.6%	80 35.4%	54 23.9%	23 10.2%	3.06	1.092

as a catalyst for students' interaction among themselves.

The availability of ICT provides more opportunities for students to work independently.	226	11	25	59	82	49	3.59	1.093
		4.9%	11.1%	26.1%	36.3%	21.7%		
Mean		10.28%	17.91%	29.82%	24.75%	17.24%	3.19	1.112

Source: Teachers' Questionnaire

Of the survey participants, 5.8% strongly disagreed, 32.7% disagreed with the assertion that they utilize ICT tools in their teaching on a regular basis, 34.1% were unsure, with 20.8% agreeing and 6.6% strongly agreeing. ICT use encourages a culture of lifelong learning since it helps students become used to looking for and using new resources on their own.

“Teachers in their school are adequately trained to integrate ICT into their lessons” is a statement that only 18.8% of the teachers strongly agreed, 27% agreed, 8.8% disagreed and 3.5% strongly disagreed respectively with the majority of respondents (42.0%) remaining uncertain.. A well-trained teacher may reduce interruptions and create a good learning environment by solving small technical problems and keeping the classes moving along smoothly.

The majority of participants agreed or strongly agreed with the statement that ICT is seamlessly incorporated into the curriculum across every subject in their school, accounting for 45.6% of total responses; strongly agreed 28.3%, undecided 18.1%, disagreed 5.3% and strongly disagreed 2.7%.

According to the study, 19% of respondents strongly agreed and 28.8% agreed with the assertion that their school provides students with up-to-date ICT resources respectively. There were 42% who were uncertain and 10.2% who either disagreed or strongly disagreed. Up-to-date ICT resources improve communication among learners, teachers, and parents. They also improve administrative operations, allowing schools to better manage records, timetables, and other critical activities.

The majority of respondents (28.3%) disagreed with the assertion that their school's evaluation techniques used ICT-based assignments. Those who strongly disagreed made up 27.4%, while 25.2% were unsure. Only 19.9% of respondents indicated they agreed or strongly agreed with the statement. The research revealed that the vast majority of teachers do not use online assessment platforms such as Google Classroom, Quizlet, Kahoot, and others.

Most respondents (31%) disagreed with the assertion that ICT improves student engagement and motivation in studying. With 21.7% strongly disagreeing and 24.5% undecided. The percentages of those who agreed and strongly agreed were 10.2% and 12.4% respectively. ICT improves student engagement and motivation by making learning more interactive, personalised, collaborative, and innovative. By incorporating ICT into education, schools may create a more engaging and interesting learning environment that suits students' different needs and interests.

The survey found that 23% of participants believed that there is adequate technical assistance available for ICT use at their educational institution. Of the respondents, 16.4% strongly agreed with the statement, 39.4% were unsure, 15.9% disagreed and 5.3 strongly disagreed respectively. For ICT to be used in schools effectively, there must be enough technical assistance. It makes sure that ICT resources run well, helps students and teachers, safeguards investments, upholds security, and encourages creativity. ICT in education cannot reach its full potential without

sufficient technical assistance, which might result in interruptions, underuse of resources, and security threats.

The results showed that while 17.3% of participants strongly agreed, 27% agreed that ICT enhances student and teacher collaboration and communication, 15% disagreed, 21.7% strongly disagreed and 19% of the participants expressed indecision. With the use of ICT, forums and other online spaces may be created so that teachers and learners can interact, exchange ideas, and work together on assignments.

According to the study, the majority of respondents (35.4%) said they were neither in agreement nor disagreement with the assertion that ICT in school encourages student engagement. In agreement and in strong agreement with the statement were 23.9% and 10.2%. With 8.0% strongly disagreed and those who disagreed making about 22.6% of the total. Students may collaborate on projects, exchange materials, and have discussions about ideas using platforms such as Google Classroom, Microsoft Teams, and other Learning Management Systems (LMS). This promotes a collaborative learning environment. Students can communicate with one another through peer-to-peer conversations, queries, and comments by using online forums and chat groups. Students may organize study groups, exchange information, and work together outside of the classroom by using applications like WhatsApp, Telegram, or even specialized educational apps.

The survey found that 21.7% strongly agreed and 36.3% agreed that having access to ICT gives students greater opportunity to work independently. Of those surveyed, 26.1% were undecided, whilst 11.1% disagreed and 4.9% strongly disagreed respectively. With the tools and resources necessary to study, do independent research, and evaluate their progress, ICT gives students the power to take charge of their education. Students who have this autonomy are better able to think critically, solve problems, and manage their time. It also encourages self-directed learning.

Hypothesis Testing

To determine the relevance and extent of each predictor's (independent variables) impact on the degree of ICT integration in education, the study used multiple regression analysis. Tables 4, 5, and 6 provide a summary of the multiple regression analysis.

Table 4: Multiple Regression Model Summary

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.520	0.317	0.261	0.54493

Predictors: (Constant), Teachers' ICT Literacy, Teachers' Perception

Dependent: Level of ICT Integration in Teaching

The values of the dependent variable as observed and those predicted by the multiple regression model have a correlation ($R = 0.520$), as shown in Table 4. The levels of ICT integration in education that were predicted and those that actually occurred correlated in this regard.

Table 4 R^2 value also shows that the amount of ICT integration might vary by 31.7% depending on the instructors' ICT literacy level and perception of ICT integration. The significance of the study's multiple regression model is seen in Table 5.

Table 5: Multiple Regression Model Significance (ANOVA)

Model	Sum of Squares	df*	Mean Square	F	Sig.
Regression	16.292	2	8.146	27.428	0.000
Residual					
Total	66.231	223	0.297		

According to Table 5, the F-ratio in the ANOVA table has a value of 27.428 and a p-value of 0.000. Because p was less than 0.05, it was concluded that the whole regression model adequately suited the data. In other words, the overall model correctly predicted the outcome variable. To put it another way, the independent variables together significantly predicted the use of ICT in teaching ($F(2, 223) = 27.428, p < 0.05$). The coefficients of the multiple regression model are shown in Table 6.

Table 6: Summary of Coefficients of Multiple Regression Models.

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	Beta	Std. Error			
1 (Constant)	1.368	0.325		4.214	0.000
ICT Literacy	0.430	0.052	0.409	8.305	0.000
Teachers Perception	0.277	0.071	0.269	3.901	0.028

Dependent Variable: Level of ICT Integration in Teaching

The estimated multiple regression equation is as follows: where the error term is set to zero and unstandardized coefficient values are added.

$$Y = 1.368 + 0.430 X_1 + 0.277 X_2$$

When all other predictors' effects are held constant, the values represent each predictor's unique contribution to the model, as illustrated above. As a result, when all other factors are held constant, ICT integration in education increases by 0.430 units ($\beta = 0.430$) for every unit increase in teachers' ICT literacy. The first null hypothesis was thus disproved. The study discovered that the use of ICT in teaching at public secondary schools in Naivasha Sub-County was greatly influenced by the ICT literacy of the teachers. This means that teachers who were knowledgeable about ICT were more likely to integrate it into their lesson plans.

Similarly, ICT integration improves by 0.277 units ($\beta = 0.277$) if instructors' perception improves by one unit. As a result, the second null hypothesis was disproved. The research found that teachers' perceptions had an impact on the integration of ICT into secondary schools in Naivasha Sub-County. It was observed that teachers who had a positive perception of ICT integration were more inclined to incorporate technology into their lesson planning.

Conclusions

Teachers that possess an excellent understanding of ICT are able to create innovative instructional methods like virtual laboratories and flipped classrooms, enhancing student engagement and making learning more dynamic. It motivates teachers to stay updated on technology and pedagogy developments, ensuring successful integration of new technologies into education and creating dynamic, individualized, and productive learning environments.

Teachers' perception of technology significantly impacts its integration into teaching. Positive views increase student achievement and optimize learning, leading to innovative strategies like blended learning and flipped classrooms. Negative views can lead to resistance, underutilization, and missed opportunities. Understanding and addressing teachers' views is crucial for successful technology integration in education, as negative perceptions can result in missed opportunities and rejection.

Recommendations

To encourage both male and female teachers to integrate ICT into the classroom and develop ICT literacy through training, the Ministry of Education needs to promote teacher training in this

area. Also government officials and policymakers need to implement measures that promote ICT literacy, especially when it comes to providing infrastructure and ICT resources to schools.

In order to gain proficiency with educational software, online resources, and digital teaching tools, teachers should regularly take part in training sessions. Similarly, administrators should oversee continuous professional development initiatives that provide teachers with up-to-date knowledge of the newest ICT tools and trends in the classroom.

For students to use technology in all subjects, not just computer science, curriculum developers should integrate ICT-based learning modules. Teachers should also be prepared to use ICT tools, such as interactive whiteboards, online simulations, and educational apps, to create dynamic and engaging lessons.

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