

**TEACHER-RELATED FACTORS IMPACTING 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 issues society faces in the twenty-first century is the incorporation of technology into educational techniques. Providing computers and setting up an Internet connection is significantly easier than effectively integrating ICT into the educational process. The purpose of the study was to ascertain how ICT integration in teaching was impacted by teachers' ICT literacy and by teachers' perceptions of ICT integration in teaching in public secondary schools in Naivasha Sub-County, Nakuru County, Kenya. The Technological Pedagogical Content Knowledge (TPACK) Model for Technology Integration in Teaching served as the focal point of the study. The study made use of a descriptive survey research design. 607 instructors from 39 public secondary schools participated in the survey. Utilizing a stratified sample, intentional sampling, and simple random sampling, the study's 242 teachers were selected. A questionnaire was used to gather data. Both descriptive and inferential statistics were applied to the data analysis. According to survey results, teachers had a moderate level of ICT literacy. They also had a positive impression of ICT integration. 35.4% of the variation in the degree of ICT integration in the classroom was explained by the two independent variables in the study ($R^2 = 0.354$). Teachers' perception ($\beta = 0.118$, $t(225) = 2.285$, $p < 0.05$) and ICT literacy ($\beta = 0.512$, $t(225) = 10.143$, $p < 0.05$). The results are anticipated to significantly influence how the government evaluates the National ICT Policy on Education and Digital Learning Programme, which was apparently created to incorporate technology for communication and information (ICT) into instructional practices in Kenyan secondary schools. According to the report, the MOE should regularly host mandatory professional development workshops to equip teachers with the necessary ICT knowledge and proficiency.

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 & Abudulai, 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

Information and communication technology is viewed as a driving force in the evolution of teaching techniques, learning approaches, and informal assessment. Kenya's government has invested heavily in reforming education by equipping schools with IC and training teachers on how to integrate ICT into the curriculum. More than 1850 teachers in Nakuru County have received ICT integration training, and the country's 19,000 primary schools now have internet connectivity. The Ministry of Education aimed for 300 Trainers of Trainers and 150 ICT technical teams to help with equipment upkeep. According to a Ministry of Education assessment, just 8% of Kenyan schools have integrated ICT into their teaching. Nakuru County had just 2.6% by 2020, a slight gain from the previous year's 0.87%. The percentage of schools utilizing ICT in the classroom, however, is still small. Little is known about how teachers' associated variables influence ICT integration in the classroom. It is unclear whether secondary school teachers in Naivasha Sub-County have sufficient pedagogical skills. As a result, this research is needed to assess how these factors influence the integration of ICT into teaching.

Research Objectives

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

Heinrich et al. (2020) noticed the perception of time and ICT integration in a study on the potential and needs of effective tablet integration in rural Kenya. A mixed-method study that included classroom observation, teacher interviews, student questionnaires, and focus groups discovered that teachers frequently left out students who were thought to be slow learners while integrating technology. Some of the educators reportedly said Due to the short amount of time in a session, they were unable to assist students who were having academic problems.

Theoretical Framework

The Technological Pedagogical Content Knowledge (TPACK) framework, will 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.

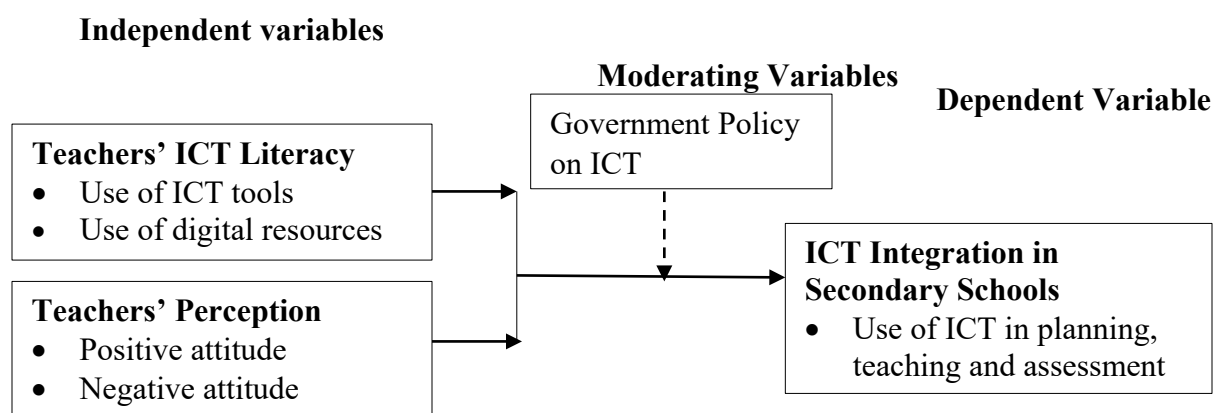


Figure 1: Conceptual framework

The three 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 and correlational 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: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$. 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

In order to gather the necessary information, 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 constituted 6.62% of the population in the sample. 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

	N	NA	LE	ME	GE	Mean	Std. Dev
Word processing in the preparation of lessons.	22	29	58	97	42	2.67	0.923
	6	12.8%	25.7%	42.9%	18.6%		
PowerPoint presentations for classroom instructions	22	60	76	60	30	2.27	0.99
	6	26.5%	33.6%	26.5%	13.3%		8
Spreadsheets in the analysis of students' marks	22	25	44	72	85	2.96	1.00
	6	11.1%	19.5%	31.9%	37.6%		8
Databases in the storage of students records.	22	39	37	68	82	2.85	1.09
	6	17.3%	16.4%	30.1%	36.3%		6
Learning Management System (LMS) e.g. Zoom, Teams, google meet for online teaching	22	97	60	46	23	1.98	1.02
	6	42.9%	26.5%	20.4%	10.2%		2
Videotaped content	22	46	67	77	36	2.46	0.98
	6	20.4%	29.6%	34.1%	15.9%		9
Educational software	22	40	63	82	37	2.53	0.96
	6	17.7%	27.9%	38.1%	16.4%		7
Printing of worksheet to be used by the students while teaching	22	35	57	66	68	2.74	1.05
	6	15.5%	25.2%	29.2%	30.1%		3

Computer simulation and/ or virtual labs	22 6	64 28.3%	65 28.8%	70 31.0%	27 11.9%	2.27	1.00 2
Locating internet/ resources for teaching	22 6	18 8.0%	45 19.9%	89 39.4%	74 32.7%	2.97	0.92 1

Key: NA- Not at all, LE- To a little extent, ME- To a moderate extent, GE- To a great extent

The ability to "adopt, adapt, and use digital devices, applications, and services" is the definition of information and communication technology (ICT) literacy according to JISC (2014). This refers to a learner's capacity to handle the technological prerequisites of becoming an online learner. In order to prepare lessons, 87.2% of teachers are proficient in word processing. The majority of respondents (42.9%) can use the program to type notes from classes to a moderate extent, followed by 25.7% and 18.6% who can do so to a considerable amount. The percentage of respondents that don't prepare lessons using software is just 12.8%.

For the classroom instructions, 26.5% of respondents said they don't utilize PowerPoint presentations. Only 13.3% of them utilize the PowerPoint presentation to a great extent; the others use it to varying degrees (33.6%, and 26.5%, little extent and moderate extent respectively). In the study of the student's grades, the spreadsheet is used by 37.6% and 31.9% of the respondents, respectively, to a great or moderate extent. 11.1% of respondents don't use the program, while 19.5% only sometimes use the spreadsheet for analyzing their grades. According to the research, 36.3% of respondents keep student records in the database to a great extent, 30.1% to moderately, but 16.4% to a small extent, and 17.3% do not save student records in the database. Less frequently, but occasionally, teachers use learning management systems (LMS) as platforms for online classroom teaching. LMS is not used by 42.9% of respondents for online teaching, it is used by 26.5% only occasionally, and only 20.4% and 10.2% of respondents utilize it moderately or greatly extent, respectively. 20.5% of the respondents don't utilize videotaped content, 29.6% use it infrequently, 34.1% use it to a moderate extent, and 15.9% use it extensively. The huge percentage of respondents who said they did not use videotaped content may be attributable to either a lack of interest in ICT integration or a lack of information about how to acquire the content from the internet.

Software created for educational purposes includes a variety of programs. The phrase refers to everything that has to do with educational solutions, including reference software and learning management systems. Nevertheless, it is still true that the purpose of educational software solutions is to increase the effectiveness and productivity of some aspects of education. The study's researcher was curious to see how teachers used this program while incorporating ICT into their lessons. Only 16.4% of respondents use educational software extensively, compared to 17.7% who don't use it.

To a great extent and moderately, 30.1% and 29.2% of respondents print worksheets for students to utilize when teaching, respectively. 25.2% print occasionally, while 15.5% do not print at all. The use of a computer to depict the dynamic responses of one system by the behavior of another system modeled after it is known as computer simulation. A simulation is a computer program that uses a mathematical description, or model, of a real system. Virtual laboratories are interactive, digital representations of activities that normally take place in physical laboratory settings. Virtual labs imitate the instruments, equipment, tests, and procedures used in normal laboratories. Computer simulation and virtual labs are used frequently and more frequently, respectively, by 31.0% and 11.9%. 28.8% employ the same practice less frequently. Only 28.3% never use them at all. Only 8.0% of teachers do not utilize the internet to gather information. Other respondents (19.9%) rarely utilize the internet for teaching resources, whereas 39.4% use the internet to find relevant information for their students. 32.7% of teachers use the internet

more regularly to obtain instructional resources for incorporating ICT into their teaching methods in the classroom. Only a few teachers lack awareness of ICT tools and approaches that can be employed in the classroom. The majority of teachers can use ICT to improve their teaching skills.

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 teachers today 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

	N	SD	D	NE	A	SA	Mean	Std. Deviation
If teachers have a positive perception toward technology, providing excellent ICT facilities may persuade them to use it in their teaching.	226	1 0.4%	13 5.8%	27 11.9%	102 45.1%	83 36.7%	4.12	0.864
Teachers must have faith that technology will make their lessons more fascinating, easier, and entertaining for them and their students, motivating, and pleasurable.	226	5 2.2%	7 3.1%	16 7.1%	89 39.4%	109 48.2%	4.28	0.894
The incorporation of ICT into the teaching process is critical.	226	6 2.6%	5 2.2%	27 11.8%	95 41.5%	93 41.9%	4.17	0.913
Students should be encouraged to use the internet to research topics they are learning about.	226	4 1.8%	8 3.5%	24 10.6%	92 40.7%	98 43.4%	4.20	0.896
The use of ICT in the classroom has a positive effect on students' higher-order thinking skills.	226	7 3.1%	7 3.1%	13 5.8%	96 42.5%	103 45.6%	4.24	0.928
The incorporation of ICT into the classroom improves students' performance in national exams.	226	7 3.1%	13 5.8%	36 15.9%	98 43.4%	72 31.9%	3.95	0.994

The use of ICT in the classroom is critical for preparing students to live and work in the twenty-first century.	226	1	11	12	78	124	4.38	0.831
		0.4%	4.9%	5.3%	34.5%	54.9%		
When ICT is integrated in the lesson, a large amount of content can be covered in a short period of time.	226	5	7	15	83	116	4.32	0.897
		2.2%	3.1%	7.0%	36.2%	51.5%		
The classroom management is in control if ICT integration is used in teaching.	226	6	12	49	104	55	3.84	0.943
		2.7%	5.3%	21.7%	46.0%	24.3%		
Students' pay more attention when ICT integration is used in teaching.	226	3	6	11	92	114	4.36	0.806
		1.3%	2.7%	4.9%	40.7%	50.4%		

Key: SA= Strongly Agree, A= Agree, NE= Neutral, D= Disagree, SD=Strongly Disagree

Table 2 indicates that 45.1% of teachers agreed and 36.7% strongly agreed that if teachers have a positive perception toward technology, offering outstanding ICT facilities may persuade them to use it in their 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, that teachers must have faith that technology will make their lessons more interesting, easier, and entertaining for them and their students, motivating, and pleasurable; however, 7.1% of respondents were neutral to the statement 5.3% either disagreed or strongly disagreed with the statement. The majority of teachers (83.2%) either strongly agreed or agreed that incorporating ICT into the educational process is vital. 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 "Students should be encouraged to use the internet to research topics they are learning about," 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 "The use of ICT in the classroom has a positive effect on students' higher-order thinking skills." 45.6% of instructors strongly agreed and 42.5% agreed with the statement while just 6.2% disagreed and strongly disagreed. However, 5.8% of teachers were undecided. The majority of teachers 43.4% agreed, and 31.9% strongly agreed, that incorporating ICT into the classroom increases students' performance on national exams. 54.9% and 34.5% of teachers strongly agreed and agreed, respectively, that using ICT in the classroom is crucial for preparing students to live and work in the twenty-first century. 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. 5.3% of the teachers who disagreed and strongly disagreed did so.

Furthermore, when ICT integration is employed in the classroom, 46.0% and 24.3% of respondents agreed and strongly agreed that classroom management is in control. 8.0% disagreed and strongly disagreed with the statement, while 21.7% were unsure. Additionally, the study found that 40.7% of respondents agreed and 50.4% of respondents strongly agreed that "Students pay more attention when ICT integration is used in teaching." Only 4.0% of respondents disagreed and strongly disagreed, while 4.9% were neutral. Most teachers either agreed or agreed strongly with each of the statements. This demonstrates that the vast majority of instructors felt favorably about using ICT in the classroom. When there are sufficient resources and infrastructures, teachers believe that ICT can be used as a pedagogical tool to improve their teaching, according to the results of other studies (Ndibalema, 2014). 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 took part in the

study exhibited a positive mindset toward the use of ICT in the educational process. The results of this study concurred with those of other research.

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

	N	NA	LE	ME	GE	Mean	Std. Dev
Use ICT to prepare lessons and reports	226	14 6.2%	75 32.7%	84 37.2%	54 23.9%	2.79	0.879
Use the internet to search for teaching material	226	8 3.5%	20 8.8%	107 47.3%	91 40.3%	3.24	0.759
Use ICT to do results analysis	226	6 2.6%	13 5.7%	49 21.8%	158 69.9%	3.59	0.720
Use the Internet to find teaching resources for my subject.	226	4 1.8%	19 8.4%	107 47.3%	96 42.5%	3.31	0.699
Use a learning management system in teaching my students online	226	65 28.8%	62 27.4%	64 28.3%	35 15.5%	2.31	1.050
Use PowerPoint to present my lesson	226	51 22.6%	71 31.4%	64 28.3%	40 17.7%	2.41	1.026
Use e-exam system to evaluate learners' progress.	226	49 21.7%	38 16.8%	50 22.1%	69 39.4%	2.79	1.180
Make use of the vast teaching aids from the internet such as charts and video clips to enhance teaching.	226	12 5.3%	39 17.3%	102 45.1%	73 32.3%	3.04	0.842
Teach using audio-visual aids such as videos	226	19 8.4%	51 22.6%	85 37.6%	71 31.4%	2.92	0.935
Make use of electronic application to calculate my students' subject grade and rank them.	226	10 4.4%	27 11.9%	69 30.5%	120 53.1%	3.32	0.852

Key: NA- Not at all, LE- To a little extent, ME- To a moderate extent, GE- To a great extent

Only 6.2% of teachers, as shown in Table 3, indicated they never used any ICT to prepare lessons or reports. Similarly, it was encouraging to see that 96.5% of teachers were using the Internet to search for teaching resources. Exam results are often reviewed using ICT, according to 97.3% of educators. The use of learning management systems for unconventional kinds of instruction is still uncommon among teachers. Only 22.6% of the teachers said they never present lessons using PowerPoint in the classroom. However, 77.4% of respondents acknowledged using PowerPoint to deliver lessons. The majority of teachers (78.3%) evaluate their students using an electronic test system. In order to assess their earners, 21.7% do not employ e-exams. A sizeable 32.3% of educators said they use the numerous online teaching resources, like charts and videos, to improve instruction. 45.1% of users download videos and charts from the internet for use in the classroom.

Teachers reported that they never utilized audio-visual aids to teach were 8.4%. While 22.6% used audio-visual occasionally, 37.6% used it frequently, and 31.4% used it frequently. 53.1% of respondents utilize an electronic tool to calculate and rank their students' subject grades more regularly. 42.4% of tutors utilize the application to calculate learner's grades. Only 4.4% of teachers never use the app. Overall, 89.5% of teachers utilized and integrated ICT resources into their lesson plans ($M = 2.97$, $SD = 0.560$). The result raises the query, "What were the factors that impacted this category of teachers to be proactive and venture into the use of ICT resources to enhance their teaching?" Is it conceivable that these instructors' earlier teaching experience gave them a positive perspective on ICT integration, led them to learn about ICT, or motivated them to employ ICT in their lessons? The following section, which also looks at the hypotheses offered in section 1.5, will provide the answers to these queries.

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	0.595	0.354	0.346	0.45326

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 ($R = 0.595$), 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's R^2 value also shows that the amount of ICT integration might vary by 35.4% 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.
1 Regression	16.684	2	8.342	40.604	0.000
Residual	45.715	223	0.205		
Total	62.399	225			

According to Table 5, the F-ratio in the ANOVA table has a value of 40.604 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 ($F(2, 223) = 40.604$, $p < 0.05$). 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		t	Sig.
	Beta	Std. Error	Beta			
1 (Constant)	1.177	0.244			4.826	0.000
ICT Literacy	0.512	0.051	0.557		10.143	0.000
Teachers Perception	0.118	0.052	0.133		2.285	0.023

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.

$$Y = 1.177 + 0.512 X_1 + 0.118 X_2$$

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 0.512 units ($\beta = 0.512$) for every unit increase in teachers' ICT literacy. Similarly, ICT integration improves by 0.118 units ($\beta = 0.118$) if instructors' perception improves by one unit, and so on. The null hypotheses of the study were tested using the t statistic (Table 6) to assess whether a p-value is substantially different from zero ($H_0: = 0$). The hypotheses were tested with 95% confidence.

H_{O1} : The use of ICT in teaching in public secondary schools in Naivasha Sub-County is not statistically significantly impacted by teachers' ICT literacy.

The unstandardized beta value for teachers' ICT literacy is higher than zero. ($\beta = 0.512$, $t(225) = 10.143$, $p < 0.05$). 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.

H_{O2} : In public secondary schools in Naivasha Sub-County, teachers' perceptions have no statistically significant impact on how ICT is integrated into instruction.

The unstandardized beta value for teachers' perceptions of ICT integration in instruction was substantially higher than zero. ($\beta = 0.118$, $t(225) = 2.285$, $p < 0.05$). 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.

Discussion of the Results

Influence of Teachers' ICT Literacy on ICT Integration in Teaching

The primary objective of this study is to examine the impact of teachers' ICT literacy on the integration of ICT in teaching within public secondary schools in Naivasha Sub-County. The study reveals that the majority of teachers employ basic computer applications, such as word processing, PowerPoint slideshows, spreadsheets, and databases, indicating a foundational level of ICT literacy. This aligns with Kamaruddin et al.'s (2017) hypothesis that teachers' familiarity and proficiency with ICT tools influence their perception of these tools as vital for teaching. However, the study highlights a gap in the utilization of learning management systems (LMS) for online education, indicating potential barriers such as lack of interest, insufficient infrastructure, or challenges in navigating the system among teachers. Additionally, teachers rated themselves as average in areas such as using filmed content and computer simulations, pointing to areas that may benefit from enhanced ICT literacy.

The study establishes a moderate average level of ICT literacy among teachers, with a significant impact on the integration of ICT in teaching. More ICT-literate teachers tend to incorporate technology into their classes more frequently. This finding supports Mbithe's (2016) conclusion of a positive link between teacher ICT literacy and ICT integration. Teachers with proficient ICT skills unlock a plethora of educational opportunities, enabling them to create dynamic, interactive, and engaging digital classes. ICT literacy enhances educational practices by accommodating diverse learning styles, fostering critical thinking, and promoting creativity. The study underscores the transformative effect of ICT literacy on instructional methods, making

classrooms more interesting, participatory, and conducive to active student engagement. Despite the positive impact of ICT literacy, the study identifies challenges such as budget constraints, outdated infrastructure, and uneven resource distribution, hindering equitable access to technology among schools and teachers. The study emphasizes the need for comprehensive training programs and ongoing support to ensure teachers' ICT skills remain current, addressing the rapid pace of technological change.

Impact of Teachers' Perception on ICT Integration in Teaching

The research explores the influence of teachers' perceptions on the adoption of ICT in teaching in public secondary schools in the Naivasha Sub-County. A substantial majority of teachers emphasize the necessity of a positive perception toward technology for competency in the present day. However, a notable minority holds opposing views. The findings align with Butucha (2012), Gakenga et al. (2015), and Ndibalema (2014), revealing a spectrum of opinions on the benefits of ICT. Despite widespread marketing of the advantages of ICT integration, some teachers remain hesitant, as noted by Gakenga et al. (2015) and Ndibalema (2014). The study reinforces the importance of teachers' perceptions, emphasizing that availability of ICT infrastructure may not significantly impact technology use in the classroom. Notably, a majority of educators concur that technology enhances learning experiences, supporting the findings of Nzwili (2017).

Teachers express varying opinions on the incorporation of ICT into the educational process. While the majority considers it vital, a notable percentage deems it superfluous. Concerns about unsupervised internet use among students highlight the complexity of introducing ICT, echoing findings by Almasi et al. (2017) and Christopher and Maria-Gorretti (2012). The hazards associated with internet use contribute to negative perceptions among some teachers. A significant majority of teachers believe that ICT improves higher-order thinking skills and facilitates efficient content coverage in the classroom. The overall favorability towards ICT integration is evident, with a notable impact on teaching practices in public secondary schools. The study aligns with Papaionnou and Charalambous (2011) and Mwila (2018), emphasizing the link between teachers' perceptions and the integration of ICT in the classroom.

Conclusions

The majority of teachers at public secondary schools in Naivasha Sub-County have a "moderate" level of ICT literacy, which means they have a fundamental understanding of the technology and can complete the task successfully with assistance, but additional training may be required.

Some teachers in Naivasha Sub-County's public secondary schools believe that by incorporating ICT into their classes, they can provide students with high-quality services. However, they did agree that teachers should supplement what they learn from textbooks with information from the internet. ICT use in the classroom was viewed by the majority of educators as an alternative teaching method that would be effective for curricula that was exam-focused. It was discovered that teachers' attitudes toward ICT integration in the classroom were moderately good.

Recommendations

The Ministry of Education must promote teacher training in this area in order to encourage both male and female teachers to improve ICT literacy through training and integrate ICT into teaching. This would boost students' achievement of stated goals. Policymakers and decision-makers in the government must put policies and decisions that encourage ICT literacy into practice, particularly when it comes to providing schools with infrastructure and ICT resources. Because teachers lack adequate ICT equipment for use in the classroom, secondary school principals should provide adequate ICT facilities and resources. As a result, both students and

teachers should have access to ICT equipment in order to improve their utilization during the learning process and give them with the skills and content to apply in actual teaching practice. Computer labs in schools should be adequately equipped.

Teacher Training Colleges (TTC) and Universities should make sure that ICT is integrated into the teacher education programs to guarantee that teachers are prepared to use ICT in the classroom. For teacher education programs, KICD should develop and maintain a standard planned ICT practical course curriculum of one sit-in test in order to ensure that graduates are professionally competent upon program completion.

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