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Teachers' Information And Communication Technologies Competency Preparedness On Teaching And Learning In Public Secondary Schools Kakamega County, Kenyan

By

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Abstract
The purpose of the study was to investigate teachers' perspective toward ICT in teaching. Research used connectivism theory that asserts technology has changed in the 21st century through formation of networks. The contention of the study is that the Kenyan government has made efforts to equip schools with technology tools like computers and to train teachers on how to utilize them in teaching, nevertheless teachers face great challenges in using ICT to facilitate learning. ICT proficiency of the educators' impacts interests and enhances learning environments where students actively engage in creation of knowledge in teaching. The study determined teachers' perspective toward ICT in teaching. Research used connectivism theory that asserts technology has changed in the 21st century through formation of networks. Descriptive survey research design was used to gather qualitative and quantitative data where principals and teachers in Mumias East sub-county formed target population of 537 comprising of 375 public secondary teachers, 135 HODs, 27 principals. Stratified sampling was utilized to select five schools i.e.one day; two boarding, mixed and single sex schools as units of sampling in urban and rural settings. Simple random sampling was used to draw 20% of total population yielding to a sample size of 105 respondents; 5 principals were purposively sampled, 25 HODs, 75 teachers were randomly sampled .Questionnaires for teachers and HODs', interview schedule for principals, an observation checklist on school infrastructure were used. Results showed ICT competence professional development has essential part of successful computer usage. Teachers were not skilled and knowledge was limited. Technological infrastructure accessibility was limited; not all technology devices were available making it impossible to incorporate ICT. Observation checklist showed low ICT resource supply in teaching. Schools had technical support and few had subscribed to online teaching materials, few schools had ICT policy. Beliefs and attitudes had a positive outlook on technology. Research concluded that teachers were slightly skilled on software usage in presentation; most schools lacked ICT policy; teachers had not subscribed to online teaching materials; low investment in ICT infrastructure due to high costs of hardware, software and related accessories, ICT improves focus on the subject matter in teaching .The study recommends teachers to undergo refresher courses in ICT. Curriculum developers and teachers should take part in planning, training and appropriation of ICT resources in schools.

Key words: ICT competence, ICT facilities access, ICT utilization and teachers' perspective on ICT

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Introduction

The motivation in technology usage in education often revolves around its ability to enhance students' learning experiences and support the digital literacy, critical thinking, collaboration and other expertise (Starkey, 2020). Technology is promoted and used in the absence of meaningful pedagogy Scully (2021). According to Almazova, (2020); Jimenez-Hernandez, (2020) there is a mismatch between technology in schools and teachers' ICT competence hence a need to examine how technology is used in schools and factors contributing to effective teaching in schools. The use of technology is becoming of significance in humans not only for daily living but also in education context. The demand for incorporating technology in educational institutions to teach skills and knowledge is high. Teachers and VET professionals have to maintain sound teaching practice successful construction of clothing models using computer technology, ICT competence is required an area the current study delved on.

UNESCO (2018) recommended a competency framework that includes six areas of ICT teacher competency: ICT curriculum and assessment system; Necessary pedagogical experience using ICT; Ability to use ICT hardware and software; Organization and management of the educational process using ICT; Professional growth in ICT. Sarycheva, (2017) opines that basic digital skills of teachers and the implementation of such training should be based on the huge potential of media education (Fedorov, 2019). Aligning education with employment needs is vital in the contemporary world, characterised by advancements in science and technology, and simultaneously considering humanities (Ayyakkannu, 2018).\

Omito (2019) states that despite the absence of appropriate empirical information on the effects of embracing ICT in most African nations, ICT policies in schools have been prioritized by the majority of African nations, however, implementation levels vary. The accessibility of technological devices can support teaching in schools. According to Adeoye & Bolaji (2022), secondary institutions do not have many ICT tools and there is no much use of ICT. According to the scholar teachers' ICT usage at Ghanaian second-cycle institutions, instructors' teaching methods were still teacher-centred, with ICT being used mostly for organizational and informational purposes.

Kenyan Ministry of education policy frameworks lament on obstacles towards effective use of technology to encompass poverty, poor electrification, and infrastructure to support constant internet connection among public learning institutions (Onyango & Ondiek 2021)

Statement of the Problem

Technology in education can transform, complement and enhance teaching in public schools. In 2006, the Kenyan Ministry of Education launched a national technology strategy aimed at enhancing teaching practices. The integration of technology was anticipated to improve access and equity in education, strengthen connections among individuals and organizations,

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facilitate the professional development of teachers, and promote efficient management of schools. Preparing schools to utilize ICT for teaching is crucial, particularly in secondary education where it is likely to lead to improved learner academic achievement through improved teacher instructional strategies.

In Kenya, the ratio of computer access to students stands at approximately 1 computer for every 150 students. Various challenges have been associated to preventing teacher's access to ICT hence the need to carry out a study on such challenges. However, to improve teachers ICT competency preparedness teachers should have ICT resources and trained on devices usage in teaching. Similarly to avoid wastage of the already undertaken energy in installing ICT infrastructure in public secondary schools teachers' competency must be improved to boost their confidence and increase usage. These measures can only be possible if the actual level of access and use of various ICT facilities is known. Additionally, there is need to establish nature of ICT skills among teachers within Mumias East sub-county, Kakamega County.

Study Objective

Determine teachers' perspective on the usage of computers on teachings elected public schools Mumias East sub-county, Kakamega.

Theoretical Framework

The study was modelled by the theory of connectivism, advanced by George Siemens& Stephen Downes (2004). It accepts that technology is part of the learning process and that continual connection affords us opportunity to make decisions regarding learning. Connectivism in education encourages educators to embrace innovative pedagogical approaches that foster a supportive learning environment and facilitate learner-cantered instruction, thereby enhancing learning across diverse communities.

Teachers ICT Perspectives and Teaching Learning

Teachers view technology preparedness as a component of digital competence. Teachers' acceptance and beliefs affects teachers' attitude towards incorporation of technology in teaching Insterford and Munthe (2017). Rokens and Krumsuvik (2016), the research revealed that teachers' preparedness and ICT usage in teaching produced a significant correlation.

The Ankara research sought to investigate high school teachers' perspectives regarding technology in teaching. The study investigated whether teachers' views differed considerably based on their teaching experience, age, gender, technology experience, ICT abilities and technology training. The findings show that instructors have a positive outlook towards using technology in teaching; however, there is no significant difference in teachers' ICT willingness based on demographic features, technology abilities and training. However, ICT experience, abilities, training, they exhibit spiteful attitudes concerning technology usage Hero (2020).

The study done in Eritrea to determine teachers' perspective towards using technology in teaching biology in schools showed that educators involved in the study exhibited a favourable attitude toward technology usage in teaching. They liked the use of technology in teaching the subject since it makes the lesson more engaging, intelligible, and improved learners' performance Belay (2020).

A study conducted in Nigeria and South Africa on the perspectives of teachers on professional development demonstrated that instructors in both nations do not have consistent

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and appropriate access to professional development opportunities. The studies also revealed that teachers' professional demands are not considered when planning various professional development programs. Participants also criticized the usage of 'one-size-fits-all' development events. Teachers also reported a lack of financial assistance for professional development activities (Ajani, 2021).

Research done on teachers toward utilisation of technology in Tanzania, it was observed teachers had a favourable attitude towards usage of technology in education. Furthermore, it showed that the relationship between attitude and age on utilisation of technology in teaching, integration of technology largely depended on student concerns and teachers' attitude towards technology utilisation IJEDICT (2018).

Study done on professional advancement in digital literacy and transformational learning, developed four themes based on qualitative data analysis to state study questions on teachers' perspectives of digital literacy and how they teach digital literacy in their setting. Participants recognized digital literacy as vital for 21st-century professions, particularly in terms of creativity and cooperation (Kerkhoffet al., 2022).

Research was done on integration of ICT in public schools in Kakamega. The study discovered that the majority of public-school instructors lacked ICT training, digital equipment, and internet access. The survey also discovered that, although teachers in public elementary institutions had good evaluations of the integration of ICT in teaching and learning, they were not utilising ICT in learning owing to various restrictions (Shikomera, 2024).

Research Design and Methodology

The research employed a descriptive survey design to collect both quantitative and qualitative data regarding teachers' preparedness in ICT competence for teaching. This design suited this study since it helped the researcher analyse facts and help one in developing an understanding of the research problem and to determine behaviour of the respondents in a natural setting as far as teacher ICT competency on teaching and learning is concerned. Questionnaire, observation checklists and interview schedule instruments were used in data-gathering.

Study Locale

The study was done in Mumias East, Kakamega County. It has three wards namely; East-wanga,Lusheya-lubinu, and Malaha -Makunga. The researcher picked the study area randomly since it is one of the counties in the country and the respondents being interviewed are employed by the teacher service commission working in public.

Findings and Discussions

The findings showed majority of the respondents a total of 105 properly filled and returned the questionnaire. This presented a response rate of 74.0%. Research by Babbie (2004) demonstrated that data analysis and publication become possible with a return rate of at least 50% and rates above 60% provide excellent results. According to these claims 74.0% response rate was very good for the study. From the interview guide, the interviews were conducted amongst 5 principals in schools in Mumias East, Kakamega region. All the 5 (100%) principals responded to the questionnaires.

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Teachers' Perceptive on Use of ICT in Teaching and Learning

The fourth study objective was to determine teachers' perspective on the usage of computers on teaching selected public schools Mumias sub-county, Kakamega.

Use of IT

Teachers and head of departments were asked to show how they perceived ICT usage in teaching.

Table 1. Use of ICT in teaching

	Disagree	Neutral	Agree	Strongly Agree
ICT makes the subject interesting	25 (33.8%)	10 (13.5%)	12 (16.2%)	27 (36.5%)
Use of ICT allows me to perform effectively and efficiently in teaching and learning.	14 (18.9%)	15 (20.3%)	14 (18.9%)	31 (41.9%)
ICT enhance teaching productivity	15 (20.3%)	15 (20.3%)	35 (47.3%)	9 (12.2%)
Teachers' age affects ICT usage in teaching effectively	4 (5.4%)	9 (12.2%)	16 (21.6%)	45 (60.8%)
ICT enhances students' concentration on subject matter	12 (16.2%)	7 (9.5%)	12 (16.2%)	43 (58.1%)

Source: Field Data (2025.

The results showed that majority of the respondents 39 (52.7%) agreed that ICT makes the subject interesting. This denotes that ICT tools allow learners to actively engage in the learning. Further results showed that a percentage of 45(60.8%) agreed that use of ICT allows them to perform effectively and efficiently in learning. Additionally, results showed that 44(59.5%) of respondents were in agreed that ICT enhance teaching productivity. In addition, results showed that 61(82.4%) were in agreement that teachers' age affects ICT usage in teaching effectively. Further results showed that 55(74.3%) were in agreement that ICT enhances students concentration on subject matter. The principals were further asked to indicate their perceptions on teachers' competence in teaching.

Results from interview guides showed that all the principals believed that ICT was important in their room instruction. Further results showed that all the principals believed that ICT can improve student achievement. In addition, all the principals indicated that they felt comfortable using ICT in classroom teaching. Further results showed that all the principals felt that ICT was easy to utilise in classroom instruction. This was therefore clear that ICT enhanced learning in schools. This was in agreement with Kamalodeen (2017) who found out that teachers accept to utilise technology in teaching since it enhances teaching and learning.

Measures that should be taken to Ensure Teachers ICT Competence Preparedness in Teaching

The principals were further asked to state measures to be considered by the stakeholders to ensure teachers' ICT competence preparedness in teaching. All the principals were in of the same opinion that the stakeholders needed to ensure school teachers are well trained on ICT usage. In addition, the principals indicated that the stakeholders need to help the school management in the acquisition of the ICT devices. The government also need to come up

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with polices that will ensure that teachers are well trained on the use of technology. Further the government should release funds that will help the school management to make purchase of the ICT equipment. This was in agreement with Kamalodeen (2017) who found out that teachers might accept to utilise technology in teaching if only training programs be on ICT skills and techniques for teaching.

On maintenance of ICT equipment, it was observed that in most of the schools there was an ICT coordinator available in the school. However, in some schools the ICT coordinator was not available. In addition, on accessibility of a computer assistant in classrooms, most of the schools had computer assistants in the classrooms. However, only few schools did not have computer assistants in the classrooms. Further on availability of working sockets on wall, most of the schools had sockets on the walls but they were not working. This was in agreement with Onojah et al. (2021) who revealed that not all technological devices are available in secondary institutions. In addition, the technological devices available are not in good condition.

Influence of Teachers' ICT Perspectives on Teaching and Learning

Regression analysis was done to determine the influence of the independent variables (teacher's ICT perspectives) and dependent variable (teaching and learning).

Table 4.2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.756a	0.571	0.565	0.55648

Source: Research data (2025)

The results presented in table 4.2 showed that teacher's ICT perspectives was found to be satisfactory variables in teaching in schools in Mumias East, Kakamega region. This means that teacher's ICT perspectives explain 57.1% of varieties in the dependent variable which is teaching and learning in schools in Mumias East, Kakamega region. This outcome further emphasis that the model applied to associate the relationship of the elements was acceptable. Table 4.3 provides the results on the analysis of the variance (ANOVA).

Table 4.3 Analysis of Variance

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	29.663	1	29.663	95.791	.000b
Residual	22.296	72	0.31		
Total	51.959	73			

Source: Research data (2025)

Table 4.3 indicated that teacher's ICT perspectives were a good predictor of education in teaching in Mumias East, Kakamega region represented by an F statistic of 45.978 and the reported p value of 0.000, which was less than the conventional probability of 0.05significance level. This shows that teacher's ICT perspectives have statistically significant influence on teaching and learning in schools in Mumias East, Kakamega region at a 95% confidence level.

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Regressions of coefficient results were presented in Table 4.4

Table 4.4: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.25	0.268		0.933	0.354
Teacher ICT perspective	0.942	0.096	0.756	9.787	0.000

Source: Field Data (2025)

In addition, results showed that teachers' perspective on the usage of computers had a positive and significant influence on teaching and learning of selected public secondary schools (β=0.942, p=0.000). This means that an enhancement in teachers' perspective on the usage of computers would lead to improvement in teaching and learning in secondary schools. The study findings agreed with Jawarneh (2017) who observed that beliefs and attitudes had an effect on technology usage in the teaching.

Furthermore, researcher conducted in depth interviews with the respondents about their personal experience with use of technology in teaching and learning. The research used open-ended questions to encourage detailed views on technology. Most of the respondents agreed that technology would lead to improvement in teaching. For example, one of the participants stated:

> I use technology for interactive whiteboards to enhance student engagement and understanding though resources are still limited

This shows that teachers' attitude is considered crucial determinant that reflects their behaviours in using technology. These findings were in agreement with Jogezai et al., 2020 regarding technology use at the secondary school still at initial stages and ICT facilities supply is low.

Another respondent stated that:

> I fear using technology for online platforms due to perceived challenges with implementation and student access

This infers that technology in schools is influenced by elements that may prevent its integration in studying. The study findings agreed with Belay (2020), use of technology in teaching makes the lesson more engaging, intelligible and improved learners' Performance.

Conclusion and Recommendations

The study aimed at assessing teachers' views on the integration of computers in teaching within selected public schools in Mumias sub-county, Kakamega.

Teachers Perspective on Usage of Computers on Teaching and Learning

The findings indicated that teachers recognized the role of ICT in making subjects more engaging. Additionally, a significant number of teachers and heads of departments (HODs) concurred that the use of ICT enabled them to teach more effectively and efficiently. Also,

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most teachers and HODs agreed that ICT enhances teaching productivity. It was also noted that many teachers believed that age influences the effective use of ICT in teaching. The findings further indicated that both teachers and HODs acknowledged that ICT improves students' focus on the subject matter.

The principals were further asked to indicate their perceptions on teachers' competence in teaching. From the results on the interview guides, all the principals believed technology being vital in classroom teaching. Further results showed that all the principals believed that technology can improve student achievement. In addition, all the principals indicated that they felt comfortable using ICT in classroom teaching. Further results showed that all the principals felt digital literacy was important in classroom teaching. Regression results showed teachers' perspective on the usage of computers had a positive and significant influence on teaching and learning of selected public secondary schools.

The study also concluded that teachers' perspective on the usage of computers had a positive and significant influence on teaching and learning of selected public secondary schools. It was concluded that the teachers and principals had a positive outlook on perceptions on technology integration in curriculum. This can be connected with Kenyan government creating awareness on introduction of technology devices such as laptops in schools. Teachers and principals were taken through the programmes.

Based on the study's findings, the perceptions and experiences of teachers and heads of departments are crucial in the adoption of technology in Kenyan secondary schools. Therefore, it is essential to implement pre-service and in-service training programs to equip them with the skills necessary for effective computer-assisted teaching. Moreover, the study suggests that the government should persist in its efforts to integrate ICT, given the positive perceptions of teachers regarding the advantages of technology in the instructional process. Teachers' attitudes towards ICT integration in education are a vital factor in the successful implementation of technology-related changes. The study aimed at assessing teachers' views on the integration of computers in teaching within selected public schools in Mumias sub-county, Kakamega.

Teachers Perspective on Usage of Computers on Teaching and Learning

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