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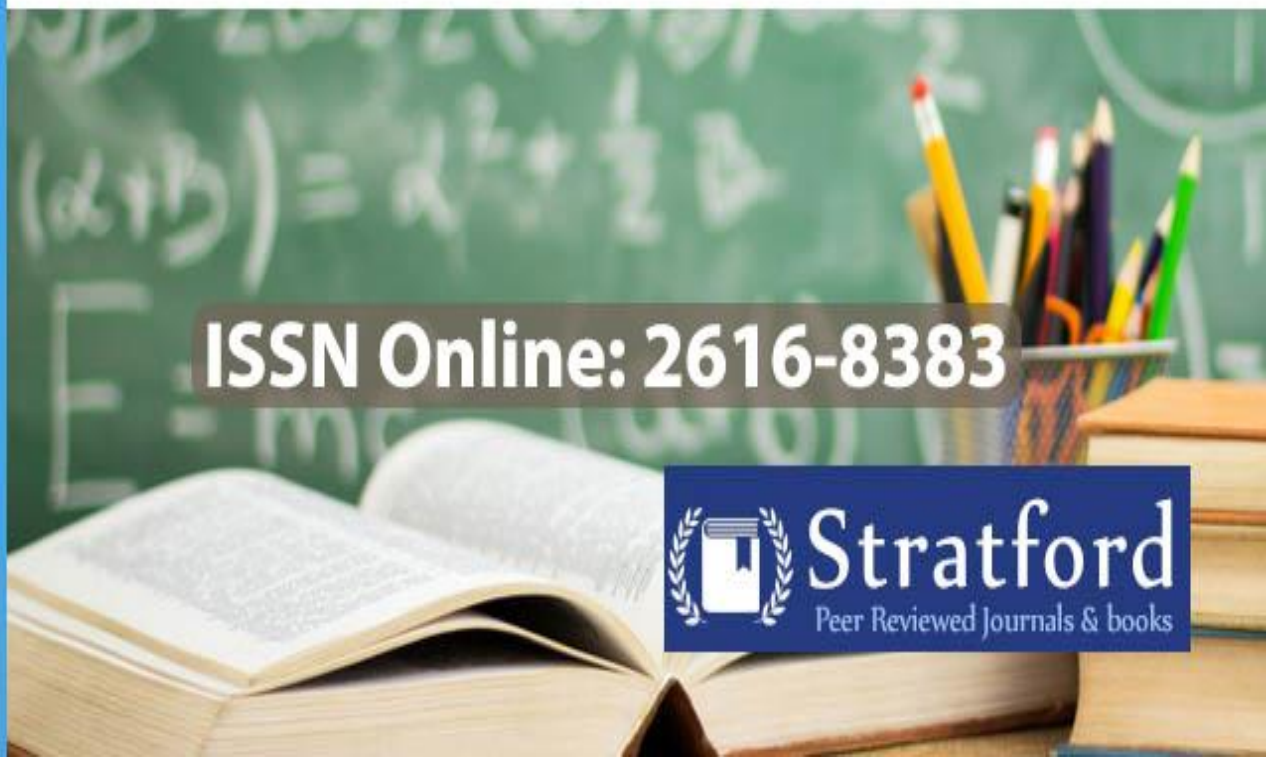

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Principals' Levels of Financing of Capacity Building Programmes as a Predictor ICT Integration in Secondary Schools in Nairobi City County, Kenya

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Abstract

The integration of Information and Communication Technology (ICT) in education is now recognized globally as essential for enhancing teaching effectiveness and improving learning outcomes. Nevertheless, many schools struggle with effective uptake of ICT, leading to low adoption rates and underutilisation of available resources. This study examined the influence of principals' levels of financing of teachers' capacity-building programmes on ICT integration in Secondary Schools in Nairobi City County. The study was anchored on information systems theory. It adopted a descriptive survey design. The population comprised 142 principals and 2,955 teachers from secondary schools in Nairobi City County. The study utilised stratified proportionate sampling to select 296 teachers and included all 142 principals. Data was collected using questionnaires, interview guides and an observation checklist. A pretest was conducted in 14 schools and confirmed construct validity through factor analysis, with all items recording factor loadings above the 0.4 threshold. Reliability was confirmed using Cronbach's alpha, with all scales yielding values above 0.7. The study found that principals' levels of financing of teachers' capacity-building programmes ($r=0.772$, $p=0.000$) had a significant positive association with teachers' ICT integration. Regression analysis revealed that principals' levels of financial support for teachers' capacity-building programs explained 59.6% of the variance in ICT integration outcomes ($R^2 = 0.596$), with budget allocation percentage ($B = 0.175$, $p = 0.000$) having the strongest impact, followed by per-teacher expenditure ($B = 0.153$, $p = 0.002$). The study concludes that the level of financing allocated by principals for teacher training is a key determinant of ICT integration in Nairobi secondary schools, as schools that invest more in teacher capacity building consistently report better technology adoption outcomes. The study recommends that principals prioritize funding and organizing regular, practical ICT capacity-building programs to strengthen teachers' digital skills and instructional effectiveness. It also recommends supporting teachers in pursuing external certifications and learning opportunities to stay updated with evolving educational technologies.

Keywords: *Principals' financing, teachers, capacity building, integration, ICT, Secondary Schools, Nairobi City County.*

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1.0 Background of the Study

The integration of Information and Communication Technology (ICT) in education is recognized globally as a transformative approach to enhancing educational quality and outcomes (Rahaman & Amadu, 2018; Republic of Kenya, 2021; Ghavifekr et al., 2014). The integration of technology represents a fundamental shift in how educational institutions operate and deliver instruction to students. The success of this integration is largely influenced by principals' managerial initiatives, as evidenced by several studies (Rahaman & Amadu, 2018; Hashim & Tasir, 2019; Martin, Budhrani & Wang, 2019). One critical area of leadership involvement is the financing of teachers' participation in capacity-building programs that equip them with essential skills (Grace, Odhiambo & Amolo, 2020; Mutisya & Mwania, 2018). Principals' support for teacher capacity building reflects a vital investment in human capital development, aimed at strengthening educators' ability to effectively apply technology in their teaching practice. Research consistently demonstrates that teacher training and professional development are essential components for improving ICT utilization effectiveness (Nyambane & Nzuki, 2019; Adianta et al., 2018).

Globally, countries face diverse challenges in their efforts to incorporate technology into teaching and learning processes. In Malaysia, Hu, AlSaqqaf and Swanto (2020), emphasized ICT integration as critical for students to develop necessary competencies for the digital age, while Pakistan's education system grapples with insufficient infrastructure and limited resources. Thannimalai, Raamani and Arumugam (2018) revealed that principals' technology leadership and teacher development opportunities significantly influence effective technology incorporation into teaching practices. In Africa, ICT integration challenges vary across countries. Nigeria faces obstacles due to lack of government support (Chimezie & Prince, 2016), while Ghana's ICT initiatives remain limited in scope with inadequate resources and weak policy frameworks (Abdul et al., 2018). Cameroon faces significant challenges due to poor infrastructure, particularly unreliable electricity and limited internet connectivity (Arrey-Ndip et al., 2020). These challenges underscore the urgent need for educational institutions across Africa to invest in stable infrastructure, comprehensive teacher training, and the development of supportive policy frameworks.

The integration of ICT in curriculum implementation represents a critical aspect of educational innovation in Kenyan schools. According to Ouma, Awuor, and Kyambo (2019), curriculum implementation through ICT involves the systematic incorporation of digital tools and resources into teaching and learning processes to enhance content delivery, student engagement, and assessment practices. The Kenya Institute of Curriculum Development (KICD, 2021) emphasizes that effective ICT integration in curriculum implementation extends beyond mere presence of technology to include strategic utilization of digital resources for achieving specific learning outcomes across subject areas. Research by Wambiri and Ndani (2017) demonstrates that successful integration encompasses various dimensions including digital lesson planning, interactive content presentation, online assessment, and technology-enhanced reporting systems. However, Macharia and Gitonga (2022) found that while 68% of Kenyan secondary schools have some form of ICT infrastructure, only 23% effectively integrate these technologies into daily curriculum implementation practices.

Kenya faces significant challenges in implementing ICT in public secondary schools, with less than ten percent offering computer studies (Kibuku, Ochieng, and Wausi, 2020). This low adoption rate contrasts sharply with ICT penetration in other sectors such as health and finance. The disparity between Kenyan schools and those in developed countries is stark, with over 61 percent of schools in countries like the USA and Japan having successfully integrated ICT

(Moreira, Rivero & Alonso, 2019). Even within Africa, Kenya's integration rate of less than 13% falls behind Tunisia (31%), Mauritius (29%), and South Africa (21%), and significantly short of the Ministry of Education's target of 25% by 2015 (Mutisya & Mwania, 2018). This study addresses a specific knowledge gap regarding the influence of principals' financing of teachers' capacity-building programs on ICT integration in Kenyan secondary schools. While theoretical insights exist, empirical evidence examining this specific relationship remains limited, particularly in the Kenyan context. By addressing this gap, the current study aims to bridge theory and practice, providing actionable insights for policymakers, school leaders, and educators to effectively leverage principals' initiatives in promoting ICT integration, ultimately enhancing educational quality and preparing students for the digital age.

1.1 Statement of the Problem

The ideal situation is that ICT integration across various sectors in Kenya, including education, should be high. This expectation is supported by Kenya's strong performance in ICT readiness, where the country was ranked second among Sub-Saharan African nations in 2021, following South Africa. However, despite this high ranking, ICT integration in schools remains limited. The Ministry of Education projected that only about 10.8% of secondary schools had integrated ICT as of 2021 (Ministry of Education, 2021), which falls significantly short of the Ministry's earlier target of 25% by 2015 (Ministry of Education, 2015). The Session Paper of 2019 emphasizes the importance of establishing a reliable ICT infrastructure to support digital literacy, noting the role of the Kenya Institute of Curriculum Development in developing digital content and promoting access to electricity—either through the national grid or solar power—in all public learning institutions.

Additionally, the Session Paper stresses the need for continuous capacity-building to support effective ICT integration in education. This includes training school administrators, education managers, and teachers to effectively use ICT tools in their instructional practices. Paul, Iravo, and Yusef (2020) observed that the Digital Literacy Programme, launched in 2016, was designed to provide digital devices to learners and build teachers' capacity to deliver digital content. However, despite such government-led initiatives, progress remains slow. Many teachers across the country continue to rely on traditional teaching methods, and the adoption of ICT in classrooms is still low. This situation undermines the transformative role technology can play in enhancing the quality of education.

In Nairobi City County, the problem is particularly concerning. Between 2019 and 2024, over KES 150 million was allocated to ICT infrastructure and teacher training programs across public secondary schools. Despite these significant investments, ICT integration remains far below expectations. According to the Nairobi County Education Office (2023), 78% of secondary schools have received ICT equipment and infrastructure upgrades, yet only 23% demonstrate consistent use of technology in classroom instruction (Ministry of Education, 2024). This gap between investment and actual integration suggests a deeper issue, particularly concerning the role of school leadership in facilitating ICT use. Specifically, there is limited understanding of how principals' financing of teacher capacity-building programs influences ICT integration in schools. This study is therefore necessary to address this knowledge gap and provide insights into the effectiveness of leadership-driven capacity-building efforts in promoting ICT adoption in Nairobi's public secondary schools.

1.2 Research Objective

To examine the influence of principals' levels of financial support for teachers' capacity-building programmes on teachers' integration of ICT in curriculum implementation in Secondary Schools in Nairobi City County.

1.3 Research Hypothesis

H_{01}: There is no significant influence of principals' levels of financial support for teachers' capacity-building programmes on teachers' integration of ICT in curriculum implementation in Secondary Schools in Nairobi City County.

2.0 Literature Review

The literature review was done in sections.

2.1 Empirical Review

Integration of ICT in schools refers to users adapting to a learning environment that utilizes emerging technologies to facilitate education (Arrey-Ndip et al., 2020; Nawaz, 2021; Egizii, 2015). This adaptation involves educators and learners adjusting to modern teaching approaches and interactive instructional methods. The integration process aims to enhance educational effectiveness by improving information access, collaboration, and personalized learning experiences. Beyond merely digitizing content, ICT integration transforms pedagogical practices to create more engaging, student-centred learning environments that address specific school needs through technology-driven solutions. Global ICT integration presents stark disparities, with developed nations like the United States, Japan, and Singapore achieving adoption rates exceeding 61% (Moreira et al., 2019), reflecting strong policy frameworks and consistent investments. In contrast, developing nations show significantly lower rates: Tunisia (31%), Mauritius (29%), and South Africa (21%) (Hiba, 2021; Ramkissoon, Belle & Bhurosy, 2020). Kenya's integration remains particularly low at only 13%, falling well below the Ministry of Education's 2015 target of 25% (Chege et al., 2018). This underperformance stems from inadequate financial resources, insufficient trained personnel, poor infrastructure, educator resistance, and inconsistent government policies.

Capacity building for teachers significantly influences ICT integration success. Research by Yakavets et al. (2017) in Kazakhstan revealed that networking and benchmarking initiatives positively impacted teachers' e-learning readiness. Similarly, Trayek et al. (2014) observed that extensive training had significant psychological effects on teacher readiness in Nablus. Nyambane and Nzuki (2019) confirmed that teacher capacity building through benchmarking, training, and seminars is key to improving ICT utilization effectiveness. This underscores the importance of comprehensive professional development in building both technical skills and psychological readiness for technology adoption. Principals play a critical role in financing teachers' exposure to capacity building. Grissom et al. (2021) highlighted that high-performing principals foster cultures of high standards, trust, and professional development. However, school leaders, particularly in underserved communities, often face resource and time constraints (Levin et al., 2020). The South Carolina Principal Leadership Network demonstrates how targeted principal training can improve support for teacher ICT integration (NIET, 2021).

Mukhari's (2016) South African study identified critical barriers including inadequate infrastructure, insufficient teacher proficiency, weak leadership, and limited funding, recommending regular ICT training workshops for teachers and principals. Best practices for

effective ICT integration emphasize structured teacher training, continuous professional development, and institutional support. School leadership is crucial in fostering innovation, with administrative backing correlating to higher adoption rates (Ramos & de Andrade, 2016). Successful programs demonstrate the importance of targeted coaching, networking opportunities, and evidence-based instructional strategies (Burkhauser, 2017). Collaborative learning environments enhance teacher confidence and competence with digital tools (Youngs & King, 2002). The Teachers Institute (2024) notes that ICT-driven professional development offers access to digital libraries, online courses, and virtual collaboration platforms, though challenges of access disparities and content relevance must be addressed. As emerging technologies evolve, they will increasingly shape teacher professional development through personalized, immersive learning experiences.

2.2 Theoretical Framework

The information systems theory presents a strong foundation for understanding the multifaceted nature of technology adoption and integration in educational settings. Initially conceptualized by Von Bertalanffy in the 1930s and later refined by Burch and Grudnitski (1989), the theory was further advanced by Weikum and Vossen (2001). It emphasizes that technology adoption is not a straightforward, linear process but a complex interaction of systemic and human factors influencing users' decisions to embrace and apply new technologies. This perspective is particularly relevant in educational contexts, where teachers' integration of ICT is shaped by institutional systems and individual attitudes. The theory is instrumental in explaining how ICT transforms teaching and learning, shifting from traditional, document-based instruction to more interactive and collaborative approaches. As noted by Lazar (2015), technology has the potential to significantly enhance teacher-student engagement and create more dynamic learning environments.

Information systems theory provides a framework for understanding how such transformation unfolds, emphasizing that successful ICT integration requires more than just access to tools—it demands meaningful engagement by users. In the context of ICT adoption in secondary schools, the theory underscores the importance of leadership, particularly the role of principals. Effective supervision by principals influences both access to ICT resources and the motivation and capability of teachers to utilize them. The theory supports the idea that structured oversight, such as teacher capacity building, professional development, and ongoing support, can shape teachers' perceptions, build confidence, and promote consistent use of ICT in instructional practices. Moreover, it highlights that integration is sustained not only by technical systems but also by leadership that fosters accountability and a culture of innovation. Therefore, the theory provides a relevant and comprehensive framework for analyzing how principals' leadership and supervisory roles contribute to the effective adoption and integration of ICT in schools.

2.3 Conceptual Framework

The conceptual framework maps the relationships between principals' teacher capacity building and ICT integration in secondary schools. Figure 1 illustrates the conceptual framework.

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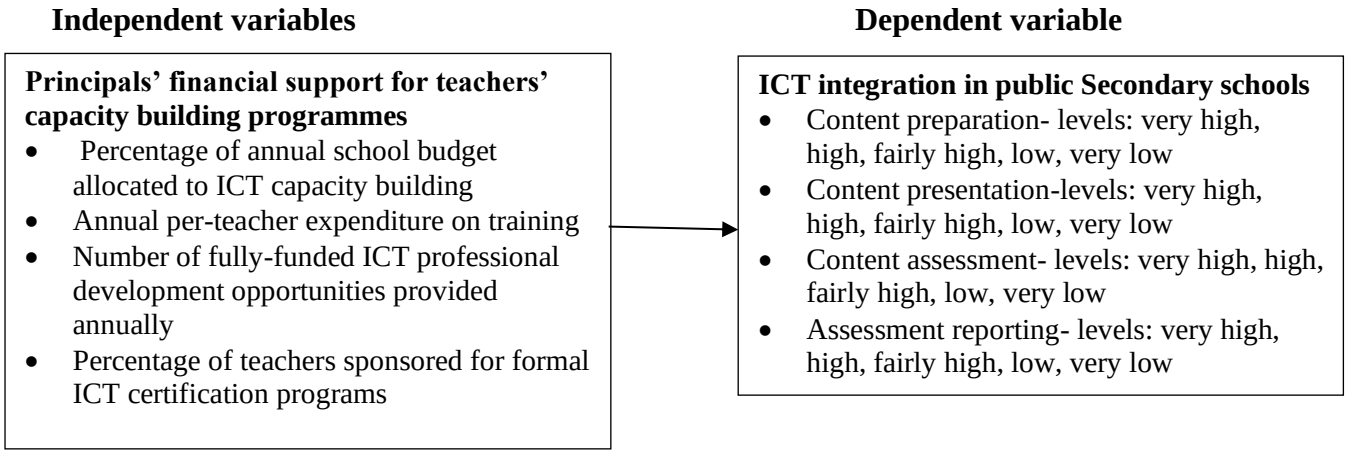
Figure 1: Conceptual Framework



3.0 Research Methodology

The study adopted a positivist research philosophy and a descriptive survey design to systematically examine ICT integration and leadership influence. The target population comprised 142 principals and 2,955 teachers from formal and informal secondary schools in Nairobi City County. The sample size for teachers was 296, representing 10% of the target population, and all 142 principals were included in the study through a census approach. A stratified random sampling technique was employed to select the teacher respondents. Data collection involved the use of structured questionnaires for teachers, interviews with principals, and an observation checklist to assess ICT infrastructure. A pretest conducted in 14 schools confirmed construct validity through factor analysis, with all items recording factor loadings above the 0.4 threshold. Reliability was established through Cronbach's alpha, with all scales achieving values greater than 0.7. Regression analysis was conducted to examine the influence of principals' financial support for teachers' capacity-building programmes on teachers' integration of ICT in curriculum implementation in Secondary Schools in Nairobi City County. Ethical approvals were obtained from NACOSTI and relevant institutions, with informed consent, confidentiality and voluntary participation upheld. Research assistants facilitated data collection to enhance efficiency and maintain methodological rigour. The analysis combined qualitative and quantitative approaches, with thematic analysis applied to qualitative data and SPSS used for descriptive and inferential statistical analysis.

4.0 Data Analysis, Presentation and Interpretations

The data analysis, presentation and interpretations were done in sections.

4.1 General and Demographic Information

The study achieved a high response rate of 92.1%, with 281 teachers (94.9%) and 126 principals (88.7%) completing and returning their research instruments. This response rate exceeded the 70% threshold recommended for social science studies (Kothari, 2004; Israel, 2013), ensuring data representativeness and reliability. The high response rate from teachers and principals indicated strong engagement with the research topic, reinforcing the credibility of the findings. The lower response rate among county education officers (70.6%) may have been due to their administrative workload, though it did not significantly affect the study's overall representativeness. The strong participation of school-based respondents minimized

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non-response bias and provided a solid foundation for analysing ICT integration in secondary schools in Nairobi City County. The demographic analysis showed that 58.7% of respondents were male, while 41.3% were female, indicating a moderate gender imbalance in the teaching profession. The majority of respondents (81.5%) were aged 36-55 years, highlighting an experienced workforce. Academic qualifications revealed that 80.4% held graduate degrees, while 14.9% had post-graduate qualifications, confirming a highly educated teaching staff. Regarding teaching experience, 44.8% had taught for 11-15 years, while 27.0% had 7-10 years of experience, demonstrating a workforce with extensive professional expertise. These findings suggest that the respondents had the qualifications, experience, and knowledge necessary to provide informed insights on ICT integration, reinforcing the credibility of the study's conclusions and recommendations for enhancing technology adoption in secondary education.

4.2 Principals' levels of Financial Support for Teachers' Capacity Building Programmes

The objective of the study was to examine the influence of principals' financial support for teachers' capacity-building programmes on teachers' integration of ICT in curriculum implementation in Secondary Schools in Nairobi City County. Descriptive statistics, including percentages, means, and standard deviations, were calculated to summarise principals' financial support for teachers' capacity-building programmes.

Table 1: Principals' Financial Support for Teachers' Capacity Building Programmes

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Deviation
The school allocates more than 2% of annual budget for ICT benchmarking visits	26.00%	55.90%	4.60%	10.00%	3.60%	2.09	1.01
The school provides at least KES 15,000 per teacher annually for ICT training	45.90%	39.50%	3.90%	5.00%	5.70%	1.85	1.09
The school funds at least 3 ICT awareness programs for teachers annually	35.20%	48.00%	5.30%	6.80%	4.60%	1.98	1.05
The school allocates KES 20,000-50,000 per teacher for ICT certification programs	21.00%	58.00%	3.60%	15.30%	2.10%	2.20	1.02
The school provides financial incentives (KES 5,000-10,000) for voluntary ICT training participation	35.90%	47.00%	1.80%	6.40%	8.90%	2.05	1.20
The school offers monetary rewards (KES 10,000-15,000) for consistent ICT integration	30.60%	50.20%	3.90%	9.60%	5.70%	2.10	1.11
The school funds at least 20% of teachers annually for specialized ICT training	33.10%	39.50%	7.10%	16.00%	4.30%	2.19	1.18
The school allocates KES 50,000-100,000 annually for ICT knowledge sharing sessions	25.60%	57.30%	2.80%	9.60%	4.60%	2.01	1.04
The school invests at least KES 150,000 annually in ICT in-service training	31.70%	42.00%	3.90%	13.50%	8.90%	2.26	1.28
The school allocates KES 200,000+ annually for school-level ICT seminars	58.70%	25.60%	2.10%	11.00%	2.50%	1.73	1.10
Average						**2.05**	**1.11**

The study examined principals' financial support for teachers' capacity-building programmes in ICT integration across secondary schools in Nairobi City County. Table 1 presents a comprehensive analysis of ten dimensions of this support, revealing consistently low levels across all measured aspects. With an overall mean score of 2.05 on a five-point scale and a standard deviation of 1.11, the findings indicate a significant gap in financial support for teachers' professional development in ICT. The data shows that allocation of more than 2% of annual budget for ICT benchmarking visits received limited support, with 81.9% of

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respondents (26.0% strongly disagreeing and 55.9% disagreeing) indicating inadequate financial backing for this activity, while only 13.6% reported receiving support. Provision of at least KES 15,000 per teacher annually for ICT training demonstrated even lower scores with a mean of 1.85, as 85.4% of teachers (45.9% strongly disagreeing and 39.5% disagreeing) reported insufficient financial assistance, compared to just 10.7% reporting adequate support. This substantial discrepancy suggests a critical underinvestment in foundational ICT training opportunities for teachers.

Funding for ICT awareness programs and allocation for certification programs also showed limited financial support with mean scores of 1.98 and 2.20 respectively. For awareness programs, 83.2% of respondents (35.2% strongly disagreeing and 48.0% disagreeing) reported insufficient support. Similarly, 79.0% (21.0% strongly disagreeing and 58.0% disagreeing) indicated inadequate financial backing for teacher certification programs. The data reveals that allocation of KES 200,000+ annually for school-level ICT seminars received the lowest financial support with a mean score of 1.73, as 84.3% of teachers (58.7% strongly disagreeing and 25.6% disagreeing) reported minimal investment in this area. Conversely, investment of at least KES 150,000 annually in ICT in-service training showed the highest mean score at 2.26, though still well below the midpoint of the scale, with 73.7% (31.7% strongly disagreeing and 42.0% disagreeing) indicating insufficient support. These findings have significant implications for ICT integration in secondary schools. The consistent pattern of low financial support across all dimensions suggests systemic underinvestment in teachers' professional development, which likely contributes to the observed low levels of ICT integration in curriculum implementation.

The results indicate that principals may not be prioritizing financial resources for capacity building, possibly due to budget constraints, competing priorities, or insufficient awareness of the critical role that professional development plays in effective technology adoption. This financial gap represents a substantial barrier to enhancing teachers' ICT competencies and confidence, which are essential for meaningful technology integration in teaching and learning. The findings underscore the need for targeted policies and strategies to increase financial support for teachers' capacity-building programmes, particularly in areas that demonstrated extremely low scores such as direct funding for ICT training (1.85) and school-level ICT seminars (1.73). The study conducted Pearson correlation analysis to examine the association between principals' financing of teachers' capacity building and teachers' integration of ICT in curriculum implementation and results are presented in Table 2.

Table 2: Pearson Correlation Analysis for Principals' Levels of Financial Support for Teachers' Capacity Building Programmes and Teachers' Integration of ICT in Curriculum Implementation

		Integration of ICT	Principals' financing of teacher's exposure to capacity building
Integration of ICT	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Principals' financing of teacher's exposure to capacity building	Pearson Correlation	.772**	1.000
	Sig. (2-tailed)	0.000	

The correlation results presented in Table 2 show a strong positive correlation (r = 0.772, p = 0.000) between principals' financial support for capacity building and teachers' ICT integration, establishing the significant association between these variables. The regression results are presented in table 3. Regression analysis is a statistical method used to examine the relationship

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between independent and dependent variables. Its primary purpose is to model and analyze these relationships, enabling the prediction of the dependent variable based on the values of the independent variables. The regression analysis in this study included model fitness, analysis of variance, and regression coefficients. Table 3 presents the model summary from the regression analysis examining the influence of principals' financial support for teachers' capacity building on ICT integration.

Table 3: Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.772a	0.596	0.590	0.3365831

The model exhibits strong predictive power with a correlation coefficient (R) of 0.772, indicating a robust positive relationship between financial support variables and ICT integration outcomes. Most notably, the R Square value of 0.596 reveals that approximately 59.6% of the variance in teachers' ICT integration can be explained by principals' financial support for capacity building programs—a substantial explanatory power in educational research. The adjusted R Square (0.590) remains close to the R Square value, confirming the model's stability and indicating that the results would likely generalize well to the broader population of secondary schools in Nairobi City County. The standard error of the estimate (0.3365831) is relatively low, suggesting good precision in the model's predictions of ICT integration levels based on financial support factors. Table 4 presents the Analysis of Variance (ANOVA) results, which assess the statistical significance of the regression model examining principals' financial support for teachers' capacity building programs

Table 4: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46.089	4	11.522	101.708	.000b
	Residual	31.268	276	0.113		
	Total	77.357	280			

The ANOVA findings provide compelling evidence for the model's validity, with an F-statistic of 101.708 (df=4,276) and a significance level of p=0.000, well below the conventional threshold of 0.05. This highly significant F-value confirms that the relationship between financial support variables and ICT integration is not due to random variation, but represents a genuine association in the population. The regression sum of squares (46.089) substantially exceeds the residual sum of squares (31.268), further supporting the model's strength in explaining variation in ICT integration outcomes. These ANOVA results justify rejection of the null hypothesis, confirming that principals' financial support for teachers' capacity building has a significant influence on ICT integration in secondary schools in Nairobi City County. Table 5 displays the regression coefficients that quantify the specific contributions of each financial support component to ICT integration outcomes.

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Table 5: Regression Coefficients

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.421	0.050		8.340	0.000
	Percentage of annual school budget allocated to ICT capacity building	0.175	0.042	0.317	4.208	0.000
	Annual per-teacher expenditure on training	0.153	0.048	0.219	3.183	0.002
	Number of fully-funded ICT professional development opportunities provided annually	0.087	0.037	0.158	2.376	0.018
	Percentage of teachers sponsored for formal ICT certification programs	0.095	0.038	0.162	2.483	0.014

a Dependent Variable: Teachers' Integration of ICT in Curriculum Implementation

The regression coefficients in Table 5 reveal the specific impact of each financial support component on teachers' ICT integration outcomes. The constant value (B=0.421, p=0.000) represents the baseline level of ICT integration when no financial support is provided, suggesting that some minimal integration occurs regardless of financial support, possibly due to individual teacher initiative or external factors. This constant is statistically significant (t=8.340, p=0.000), indicating that this baseline effect is reliable and consistent across the sample. The significant constant value also suggests that while financial support is crucial, other foundational factors continue to influence integration outcomes. Among the predictor variables, the percentage of annual school budget allocated to ICT capacity building demonstrates the strongest influence (B=0.175, p=0.000), indicating that for each unit increase in budget allocation percentage, teachers' ICT integration increases by 0.175 units, holding other factors constant. This variable also shows the highest standardized coefficient (Beta=0.317), confirming its dominant relative importance in the model. The substantial t-value (4.208) and significance level (p=0.000) provide strong evidence that formalized budget allocations specifically for ICT capacity building represent a high-leverage strategy for improving integration outcomes in Nairobi secondary schools.

The annual per-teacher expenditure on training shows the second strongest impact (B=0.153, p=0.002), revealing that when per-teacher spending increases by one unit, ICT integration increases by 0.153 units, controlling for other variables. With a standardized coefficient of Beta=0.219, this finding highlights the importance of adequate individual teacher investment rather than spreading resources thinly across multiple initiatives. The statistically significant t-value (3.183, p=0.002) underscores the reliability of this relationship, suggesting that school leaders should prioritize substantial per-teacher expenditure as a key strategy for enhancing technology adoption. The number of fully-funded ICT professional development opportunities (B=0.087, p=0.018) and the percentage of teachers sponsored for formal ICT certification programs (B=0.095, p=0.014) both make smaller but still significant contributions to ICT integration. Their comparable standardized coefficients (Beta=0.158 and Beta=0.162 respectively) indicate similar levels of relative importance in the model. Both variables exhibit t-values above the critical threshold of 2.0 with p-values below 0.05, confirming their statistical significance. These findings suggest that while budget allocation and per-teacher expenditure should be primary considerations, providing structured professional development opportunities

and formal certification pathways also play meaningful roles in enhancing teachers' ICT integration in curriculum implementation.

These inferential statistics were further contextualized through qualitative interviews with principals. The interview responses consistently supported the statistical findings, with no significant contradictory voices emerging. Respondents uniformly acknowledged the critical importance of financial support for capacity building in enhancing ICT integration. Several key themes emerged regarding the impact of financial support for capacity building on ICT integration: Enhancement of technical competencies: The Principal of a Formal school in Embakasi East emphasized: "*Financing capacity building programmes directly enhances teachers' technical skills, providing them with the necessary competencies to effectively use and integrate ICT tools in their teaching methodologies*." Currency with technological advancements: The Principal of the informal school in Westlands observed: "*Financial support for professional development ensures teachers stay updated with the latest technological trends, emerging educational technologies, and innovative digital teaching strategies*." Curriculum-specific implementation: The Principal of a Formal school in Starehe explained: "*Structured capacity building programmes enable teachers to develop a nuanced understanding of how to seamlessly integrate ICT into various curriculum areas*."

The interviews revealed that principals' capacity building initiatives focused on specific applications of ICT in education that directly support the regression findings. Principals reported that allocating larger percentages of school budgets to ICT capacity building yielded visible improvements in teachers' integration practices. One principal noted: "*When we increased our ICT training budget from 1% to 3% of our annual allocation, we saw a dramatic improvement in teachers' digital lesson planning and presentation skills within just one term*." This observation directly supports the regression finding that budget allocation percentage (B=0.175) has the strongest impact on integration outcomes. Another principal shared: "*We prioritized investing KES 20,000 per teacher annually for specialized ICT training rather than spreading resources thinly, and this focused approach significantly improved our integration levels across all departments*," confirming the importance of substantial per-teacher expenditure (B=0.153) identified in the regression analysis.

The specific focus areas of capacity building programs highlighted by principals aligned with the measured dimensions of ICT integration. Principals emphasized investment in training for digital content preparation, interactive content presentation, online assessment administration, and electronic reporting systems. One principal explained: "*We specifically funded training on digital content creation and smart board usage, which led to a complete transformation in how our teachers present curriculum materials*." Another principal reported: "*Our investment in training for online assessment development yielded the most immediate returns, with teachers rapidly adopting digital evaluation methods that improved both efficiency and student engagement*." These observations help explain why schools with targeted financial support for specific integration domains demonstrated higher overall integration scores.

Principals also highlighted the psychological impact of financial support for capacity building, an important mediating factor between investment and outcomes. One principal stated: "*Beyond skill development, our financial commitment to teacher training significantly boosted confidence levels. Teachers who initially feared technology became its champions once they felt adequately supported*." This insight adds important context to the statistical relationship, suggesting that financial support works not only by developing technical skills but also by addressing psychological barriers to adoption. Another principal observed: "*The psychological impact of knowing the school values their professional development enough to invest*

substantial resources cannot be overstated—it fundamentally changes teachers' attitudes toward technology integration."

The sustainability of financial support emerged as a critical theme in the principal interviews, with implications for long-term integration success. One principal explained: "*Consistent, year-over-year financial commitment to capacity building creates momentum that sporadic investments simply cannot achieve. Our three-year funding plan for teacher development has yielded progressively better integration results each year*." This observation suggests that the predictive power of financial variables may be even stronger when measured over extended periods. Another principal noted: "*By establishing a dedicated ICT capacity building fund rather than relying on ad hoc allocations, we've been able to systematically increase both the quantity and quality of teacher training, with corresponding improvements in integration outcomes*."

The principal interviews also revealed important insights about maximizing return on financial investment in capacity building. Several principals emphasized the importance of strategic resource allocation based on specific integration priorities. One principal shared: "*We found that concentrating our financial resources on fewer, more intensive training programs yielded better results than funding many short workshops*." Another explained: "*By prioritizing certification programs that blend theoretical understanding with practical application, we've achieved more sustainable integration outcomes than through generic training approaches*."

These perspectives offer valuable guidance for school leaders seeking to optimize the impact of limited financial resources, suggesting that strategic investment choices can enhance the effect sizes identified in the regression analysis. As one principal summarized: "*Financial support is necessary but not sufficient—the strategic targeting of those resources toward specific integration priorities is what ultimately determines the return on investment*."

In summary, principal interviews corroborated these findings, emphasizing that financial support enhances technical competencies, keeps teachers current with technological advancements, and enables curriculum-specific implementation. Principals reported visible improvements in integration following increased budget allocations, noting that concentrating resources on specific training areas yielded better results than dispersed investments. They highlighted the importance of both adequate funding levels and strategic allocation, revealing that financial support works by developing technical skills and addressing psychological barriers to adoption. The data consistently shows that schools allocating higher percentages of their budgets and providing substantial per-teacher investments achieve significantly better ICT integration outcomes, suggesting that financial support for capacity building represents a high-leverage strategy for improving educational technology adoption in Nairobi secondary schools.

The findings underscore the importance of financial support in enhancing ICT integration, revealing that investments in teacher capacity building significantly improve technology adoption. This supports Grissom et al. (2021), who found that strategic resource allocation by principals fosters instructional innovation, and aligns with Ramos and de Andrade (2016), who observed that administrative support boosts technology uptake among teachers. The study extends Mukhari's (2016) work by quantifying the financial aspect of leadership support and affirms Thannimalai et al. (2018), who emphasized the influence of principals' technology leadership on classroom practices. It also echoes Yakavets et al. (2017), whose research linked capacity-building efforts with improved e-learning readiness. Trayek et al. (2014) similarly found that training and workshops enhanced teachers' psychological readiness for e-learning, while Nyambane and Nzuki (2019) noted that benchmarking, seminars, and training are vital for effective ICT use. With Kenya's current ICT integration rate at 13%, these findings offer

strong empirical support for policies mandating financial support for teacher training to meet the national target of 25%.

4.3 Teachers' Integration of ICT in Curriculum Implementation

The dependent variable in this study was teachers' integration of ICT in curriculum implementation in Secondary Schools in Nairobi City County and Table 6 presents the summary.

Table 6: Teachers' Integration of ICT in Curriculum Implementation

ICT Integration Dimensions	Very Low Level (1)	Low Level (2)	Fairly High Level (3)	High Level (4)	Very High Level (5)	Mean	Std. Deviation
Content Preparation							
Digital lesson planning and resource development	35.90%	42.00%	4.60%	8.90%	8.50%	2.12	1.23
Use of electronic templates for schemes of work	41.30%	39.10%	5.70%	7.50%	6.40%	1.98	1.15
Integration of online resources in lesson preparation	42.30%	45.60%	4.30%	5.30%	2.50%	1.80	0.93
Content Presentation							
Use of multimedia and digital visual aids	34.90%	46.30%	4.30%	8.90%	5.70%	2.04	1.12
Implementation of interactive digital teaching tools	47.70%	38.80%	3.20%	6.40%	3.90%	1.80	1.06
Integration of virtual demonstrations in teaching	51.60%	36.30%	2.80%	5.70%	3.60%	1.73	1.02
Content Assessment							
Administration of online examinations	38.10%	48.40%	1.80%	7.80%	3.90%	1.91	1.03
Use of digital formative assessment tools	41.60%	44.10%	3.60%	6.80%	3.90%	1.87	1.04
Implementation of automated grading systems	46.30%	42.70%	2.10%	5.00%	3.90%	1.78	1.00
Assessment Reporting							
Digital results management and analysis	33.50%	52.30%	1.10%	5.00%	8.20%	2.02	1.13
Electronic reporting to parents and stakeholders	38.10%	29.20%	3.20%	20.60%	8.90%	2.33	1.39
Implementation of real-time grade access systems	51.20%	37.40%	2.50%	5.70%	3.20%	1.72	0.98
Average						**1.93**	**1.09**

The study found that teachers' integration of ICT in curriculum implementation across secondary schools in Nairobi City County was significantly low, with an overall mean score of 1.93 on a five-point scale. Using a comprehensive framework that categorized integration levels as Very Low (1), Low (2), Fairly High (3), High (4), and Very High (5), the analysis revealed consistent underutilization across all four key dimensions of curriculum implementation. In the Content Preparation dimension, digital lesson planning and resource development received the highest mean score (2.12), with 77.9% of respondents (35.9% at Very Low level and 42.0% at Low level) indicating minimal adoption. Only 17.4% of teachers reported High or Very High levels of digital lesson planning. The integration of online resources in lesson preparation showed the lowest mean score in this category (1.80), with 87.9% of teachers reporting Very Low or Low levels of implementation.

For content presentation, the use of multimedia and digital visual aids achieved a mean score of 2.04, with 81.2% of teachers (34.9% at Very Low level and 46.3% at Low level) reporting limited adoption, while only 14.6% indicated High or Very High utilization. The integration of virtual demonstrations in teaching recorded the lowest score across all presentation activities (1.73), with 87.9% of teachers reporting Very Low or Low levels of implementation. The Content Assessment dimension demonstrated particularly low adoption levels, with administration of online examinations scoring 1.91. A substantial 86.5% of respondents (38.1% at Very Low level and 48.4% at Low level) indicated minimal implementation of digital assessment approaches. Implementation of automated grading systems showed the lowest adoption in this category (1.78), with 89.0% of teachers reporting Very Low or Low utilization levels.

In the assessment reporting dimension, electronic reporting to parents and stakeholders received the highest mean score across all measured activities (2.33), with 67.3% of teachers reporting Very Low or Low levels while 29.5% indicated High or Very High implementation. This relatively higher adoption rate suggests that external stakeholder communication requirements may be driving technology integration in this area. However, implementation of real-time grade access systems showed the lowest adoption (1.72), with 88.6% of teachers reporting Very Low or Low levels. The consistently low mean scores across all dimensions and specific activities, coupled with the high percentages at Very Low and Low levels, indicate a systematic gap in ICT integration rather than isolated challenges with specific applications. These findings highlight the need for targeted interventions to enhance teachers' capacity, confidence, and motivation to integrate ICT across all aspects of curriculum implementation, with particular attention to areas showing extremely low adoption such as virtual demonstrations, real-time grade access systems, and automated grading.

4.4 Discussions of the Findings

The findings reveal a critical relationship between principals' financial support for capacity building and teachers' ICT integration in Nairobi secondary schools. Schools where principals allocated higher percentages of their budgets to teacher training consistently demonstrated superior levels of ICT integration across all measured dimensions. This pattern was particularly evident in digital content preparation and electronic assessment reporting, where schools with structured financial support programs showed markedly higher adoption rates. These results align with previous research by Yakavets et al. (2017) and Thannimalai et al. (2018), who identified leadership support as crucial for successful technology adoption, while extending their work by demonstrating the specific impact of financial dimensions of support in the Kenyan context.

The study found that most schools significantly underinvest in teacher capacity building, with inadequate financial support reported across all measured dimensions. This widespread underinvestment helps explain Kenya's ICT integration rate of 13%, which falls well below both regional comparisons and the Ministry of Education's target of 25%. The findings suggest that current approaches to capacity building are insufficiently funded, limiting teachers' ability to develop both technical competence and psychological readiness for technology adoption. While national policies recognize the importance of ICT integration, this study reveals a substantial implementation gap at the school level, where resource allocation decisions often fail to prioritize teacher development in technology.

Principal interviews revealed important qualitative dimensions of financial support that enhance its effectiveness. Schools that concentrated resources on fewer, more intensive training

programs achieved better results than those dispersing funds across many initiatives. Principals also emphasized that consistent, year-over-year financial commitment creates momentum that sporadic investments cannot achieve. Furthermore, financial support works not only by developing technical skills but also by signaling institutional commitment, which positively influences teacher attitudes toward technology. These perspectives help explain why schools with similar overall investment levels sometimes showed different integration outcomes, suggesting that both the amount and strategic allocation of financial resources matter.

The findings have significant implications for educational leadership and policy. For principals, the results suggest that formal budget allocations specifically for ICT capacity building represent a high-leverage strategy for improving integration outcomes. Ensuring adequate per-teacher expenditure appears more effective than spreading resources across multiple initiatives. For policymakers, these findings provide evidence for policies that mandate minimum levels of financial support for teacher capacity building as a means to accelerate technology adoption in secondary education. Given Kenya's current integration challenges, structured approaches to financing professional development may be necessary to achieve national technology goals in education. Teacher preparation programs should also emphasize formal recognition of ICT competencies to enhance educators' motivation and ability to integrate technology effectively.

5.0 Conclusion

The study concludes that principals' levels of financial support for teachers' capacity-building programmes is a crucial determinant of teachers' levels of integration of ICT in curriculum implementation in Secondary Schools in Nairobi City County. The study finds that the financing of teachers' capacity-building programs is the most influential factor in determining the extent of ICT integration in secondary schools. Schools that allocate sufficient resources for teacher training and professional development experience better ICT adoption outcomes. This conclusion underscores the importance of equipping teachers with the necessary skills and confidence to utilize technology effectively in the classroom. Teachers who undergo continuous training and exposure to ICT tools are more likely to integrate them into lesson planning, classroom instruction, and student assessments. Effective technology adoption in education depends not only on access to digital tools but also on adequately training teachers to utilize them for interactive, personalized, and engaging learning experiences.

6.0 Recommendations

The study recommends that principals should prioritize financing teachers' exposure to capacity-building programs to enhance their ICT skills and pedagogical competencies. They should organize regular training workshops and professional development programs to equip teachers with the necessary digital skills. These programs should be held at least once per academic term and designed to be practical, hands-on, and comprehensive to enhance teachers' confidence in using ICT tools effectively. Furthermore, principals should facilitate benchmarking opportunities for teachers to learn from best practices in other schools that have successfully integrated ICT into their teaching practices. Schools should also encourage teachers to participate in external ICT-related certification programs, webinars, and online courses to stay updated with emerging trends in educational technology. By investing in continuous teacher capacity building, principals can foster a knowledgeable and confident workforce capable of effectively integrating technology into their instructional practices.

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