ROLE OF ICT COMPETENCE OF SCHOOL SUPERVISORS IN ENHANCING EFFECTIVE EDUCATIONAL MONITORING

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Abstract

This study examined the influence of ICT competence on the effectiveness of educational monitoring among school supervisors in Nigerian public secondary schools. The study explored how supervisors' digital skills and the use of ICT-based supervision tools affect the quality, timeliness, and accuracy of monitoring outcomes. A quantitative descriptive survey design was employed, involving a population of 210 school supervisors across Lagos State. Using Yamane's (1967) formula, a sample of 136 was selected through stratified random sampling. Data were collected using a validated and reliable questionnaire (Cronbach's Alpha = 0.87 and 0.82) and analyzed with SPSS version 23.0, employing both descriptive and inferential statistics. Findings revealed a strong, positive correlation ($r = 0.684$, $p < 0.05$) between ICT competence and effective educational monitoring. Regression analysis further showed that ICT-based tools significantly influenced monitoring efficiency ($F = 73.289$, $p < 0.05$), explaining 37.3% of the variance in outcomes. Study concludes that ICT competence is a crucial enabler of adequate supervision, enhancing timeliness, feedback quality, and data accuracy. It recommends continuous ICT training for supervisors,

provision of digital infrastructure, and integration of ICT-based frameworks into educational supervision policies to ensure sustainable quality assurance in Nigeria's education system.

Keywords: ICT competence, educational monitoring, School supervision, Technological Acceptance Model, Public secondary schools

Introduction

In the contemporary knowledge economy, education remains one of the most dynamic sectors undergoing digital transformation. Globally, the integration of Information and Communication Technologies (ICT) into educational administration and supervision has revolutionized the way teaching and learning processes are monitored, evaluated, and enhanced. Effective educational monitoring, which once depended on manual inspection and periodic school visits, now increasingly relies on digital tools that facilitate real-time supervision, data analysis, and performance tracking (Gerona & Bautista, 2022; Astuti & Nur, 2025). ICT competence among school supervisors has therefore become a cornerstone of modern educational leadership, enabling supervisors to provide evidence-based feedback, foster accountability, and support teacher professional development through virtual means (Ghavifekr & Ibrahim, 2024).

Across the world, ICT competence has been recognized as essential for educational supervisors who must adapt to the digitalization of instructional processes. In Indonesia, for example, digital academic supervision has enhanced the professionalism of teachers by promoting collaboration and personalized learning networks between supervisors and educators (Kamilatun et al., 2024). Similarly, research in the Philippines and Malaysia has revealed that supervisors who possess strong ICT skills demonstrate greater efficiency in documentation, data management, and communication, ultimately improving school performance (Esllera & Escala, 2024; Ghavifekr & Ibrahim, 2024). According to Mulyanti (2023), the post-pandemic "new normal" era has underscored the importance of virtual supervision, where ICT tools bridge geographical barriers and ensure the continuity of quality monitoring even in remote or underserved areas.

In the African context, the role of ICT in supervision is gaining increasing attention as education systems strive to meet global standards for quality assurance. Many African countries are now embedding ICT-based supervision within their educational policies to strengthen transparency and performance management (Emanuel & Mwila, 2023). For instance, studies in Kenya, Ghana, and Ethiopia indicate that integrating ICT into supervisory practices improves the efficiency and

timeliness of feedback to teachers, while also reducing the bureaucratic delays associated with traditional paper-based supervision systems (Afework, Frew, & Abeya, 2017; Kusi, Keelson, & Adzifome, 2019; Yego, Amimo, & Mendoza-Role, 2020). Despite these gains, challenges persist, including inadequate infrastructure, limited internet connectivity, and low digital literacy among supervisors, factors that continue to hinder effective ICT utilization (Thomas, Issah, & Noah, 2025).

In Nigeria, ICT competence among school supervisors has become a critical issue in the discourse on educational reform and quality monitoring. The Federal Ministry of Education's strategic framework emphasizes digital capacity-building for supervisors as part of efforts to improve accountability and enhance learning outcomes. However, the pace of adoption remains uneven across regions. While some urban districts have begun implementing digital supervision tools for lesson observation, teacher appraisal, and performance evaluation, many rural schools still rely heavily on manual methods that limit efficiency and transparency (Yahaya & Bolaji, 2023). Studies by Obi, Offu, and Otu (2024) reveal that supervisors with strong ICT competence are better equipped to manage classroom observations, provide immediate feedback, and track instructional quality effectively. Similarly, Olorunmaiye, Awoyale, and Isiyaka (2025) found that ICT-supported supervision in Niger State significantly enhanced mathematics teaching quality through improved data-driven decision-making and teacher engagement.

In today's technology-driven world, education systems increasingly depend on Information and Communication Technologies (ICT) to ensure accountability, quality teaching, and effective monitoring. Yet, in many developing countries, the adoption of ICT in school supervision remains slow and uneven. While studies around the world show that supervisors who possess strong ICT competence can provide timely feedback, track teachers' performance, and improve instructional quality (Gerona & Bautista, 2022; Kamilatun et al., 2024), much of this evidence comes from contexts where digital infrastructure and training are well established (Astuti & Nur, 2025).

Across Africa, and particularly in Nigeria, the situation is quite different. Supervisors often face multiple challenges, ranging from poor digital skills and unreliable internet access to limited institutional support, that prevent them from fully embracing ICT tools in their monitoring duties (Emanuel & Mwila, 2023; Thomas, Issah, & Noah, 2025). Although the Nigerian government has introduced various educational technology initiatives, supervision in many public secondary schools is still carried out through manual record-keeping, physical visits, and delayed reporting (Yahaya & Bolaji, 2023; Obi, Offu, & Otu, 2024). Existing research in Nigeria has focused mainly on ICT use in teaching and school administration (Ibrahim, Azhar, & Muhammad, 2024; Olorunmaiye, Awoyale, & Isiyaka, 2025), but very little is known about how supervisors' ICT competence affects the effectiveness of educational monitoring. This lack of focused empirical evidence creates a

significant gap that this study seeks to fill by examining how supervisors' digital skills influence the quality and efficiency of monitoring processes in Nigerian secondary schools.

The main objective of this study is to examine how ICT competence of school supervisors influences effective educational monitoring in Nigerian public secondary schools. Specifically, the study seeks to:

1. Assess the relationship between supervisors' ICT competence and the effectiveness of educational monitoring practices.
2. Examine the influence of ICT-based supervision tools on the timeliness, accuracy, and quality of monitoring outcomes.
3. How does the ICT competence of school supervisors relate to the effectiveness of educational monitoring?
4. In what ways do ICT-based supervision tools improve the quality and timeliness of educational monitoring?

Information and Communication Technology (ICT) competence refers to the ability to effectively use digital tools, platforms, and systems to collect, analyze, and communicate information for decision-making (Ibrahim, Azhar, & Muhammad, 2024). In the context of educational supervision, ICT competence encompasses supervisors' ability to employ technology in planning, monitoring, evaluating, and reporting instructional activities. Globally, ICT-literate supervisors utilize electronic tools such as digital dashboards, online reporting platforms, and e-observation systems to enhance efficiency and accuracy (Gerona & Bautista, 2022). In developed countries, ICT competence is seen not merely as a technical skill but as a core leadership attribute that fosters accountability and instructional improvement (Ghavifekr & Ibrahim, 2024). In contrast, in many developing nations, particularly in Africa, limited ICT training and inadequate infrastructure have hindered the integration of technology into supervisory practices (Emanuel & Mwila, 2023). Nigerian supervisors, though aware of the benefits of ICT, often lack the training or institutional support to apply such tools effectively (Yahaya & Bolaji, 2023).

Educational supervision is the process of guiding, supporting, and evaluating teachers to improve instruction and promote quality learning outcomes (Mulyanti, 2023). Adequate supervision involves observing classroom teaching, providing feedback, organizing professional development, and ensuring adherence to curriculum standards (Agegnehu, 2021). Monitoring, on the other hand, focuses on systematic data collection and evaluation of teaching-learning activities to ensure accountability and continuous improvement (Yego, Amimo, & Mendoza-Role, 2020). Globally, supervision has evolved from traditional inspection models to collaborative and technology-

enhanced systems. In Indonesia, for instance, digital supervision models have improved real-time feedback and strengthened teacher professionalism (Kamilatun et al., 2024). In Nigeria, however, many supervisors still rely on manual reporting and irregular school visits, which limit efficiency and responsiveness (Obi, Offu, & Otu, 2024).

ICT competence among supervisors plays a crucial role in facilitating effective educational monitoring. Supervisors who can use technology efficiently are better equipped to collect accurate data, analyze teacher performance trends, and communicate timely feedback (Wiyono et al., 2022). The use of ICT in supervision enhances transparency, reduces bureaucratic delays, and enables supervisors to oversee multiple schools remotely (Astuti & Nur, 2025). Empirical evidence from Indonesia, Kenya, and Tanzania demonstrates that ICT-supported monitoring improves teaching practices and student outcomes (Emanuel & Mwila, 2023; Yego et al., 2020). In Nigeria, ICT tools such as online appraisal forms, mobile monitoring systems, and data dashboards are gradually being introduced but remain underutilized due to low supervisor competence and infrastructural gaps (Yahaya & Bolaji, 2023). This underscores the urgent need for capacity building and digital literacy training for supervisory personnel.

The Technological Acceptance Model (TAM) was developed by Fred Davis in 1989 to explain why people choose to accept or reject new technologies. At its core, the model suggests that two key beliefs shape technology use: Perceived Usefulness (PU), the degree to which a person believes that using a particular technology will improve their performance, and Perceived Ease of Use (PEOU), the extent to which they believe the technology will be free of effort. In relation to this study on the ICT competence of school supervisors and effective educational monitoring, TAM provides valuable insight into how supervisors' attitudes and perceptions influence their use of digital tools. For instance, when supervisors view ICT as helpful in making school monitoring faster, more transparent, and data-driven, they are more inclined to adopt it. Likewise, if they find these tools easy to navigate—such as e-monitoring platforms, digital record systems, and online feedback tools-they are more likely to use them consistently. This explains why ICT competence is a critical factor in improving the overall effectiveness of educational monitoring.

TAM is particularly suitable for this study because it aligns with understanding how supervisors' perceptions and skills shape their actual use of ICT. It helps to link technology acceptance with competence and practical application in educational supervision, providing a behavioral explanation for varying levels of ICT adoption across schools. However, the model has its limitations. It tends to oversimplify the complex realities of technology use by focusing mainly on individual attitudes. In contexts like Nigeria, other factors—such as lack of ICT infrastructure, poor internet access, limited training opportunities, and inadequate policy support—can significantly influence adoption.

Therefore, while TAM helps explain the "why" behind supervisors' ICT use, it must be considered alongside these broader contextual and institutional challenges to understand technology acceptance in educational monitoring fully.

The **Systems** Theory, proposed by Ludwig von Bertalanffy in 1950, views an organization or institution as a complex system made up of interrelated and interdependent parts that work together to achieve common goals. The theory emphasizes that the effectiveness of the whole depends on the proper functioning and coordination of its individual components. In educational settings, this means that schools operate as systems where teachers, administrators, supervisors, students, and resources must interact harmoniously to achieve quality education. In relation to this study on the ICT competence of school supervisors and effective educational monitoring, Systems Theory provides a strong framework for understanding how supervisory functions fit into the larger educational ecosystem. School supervisors act as linking elements between educational authorities, teachers, and the learning process. Their ICT competence serves as a key input that enhances communication, data management, and timely feedback—processes that are essential for maintaining system efficiency and balance. When supervisors effectively use ICT tools, they improve the coordination between these subsystems, leading to better monitoring outcomes and overall school performance.

Systems Theory is relevant to this study because it highlights the interconnectedness of all components within the education system. It helps explain how enhancing one element—such as supervisors' ICT competence—can positively influence other parts, including teacher performance, policy implementation, and student outcomes. The theory, therefore, supports the idea that effective educational monitoring relies not only on individual competence but also on a well-coordinated system that promotes continuous feedback and improvement. While Systems Theory provides a holistic perspective, it has been criticized for being overly abstract and not accounting for human and contextual factors such as motivation, resistance to change, or resource limitations. In the Nigerian context, systemic challenges like inadequate ICT infrastructure, insufficient funding, and bureaucratic delays may hinder the smooth functioning of the educational system, despite the competence of individual supervisors. Hence, although the theory effectively explains the need for coordination, it must be applied with consideration of the practical realities that affect system performance in public schools.

Globally, studies have consistently linked ICT competence to improved supervision outcomes. Gerona and Bautista (2022) found that e-supervision models increased teacher engagement and reduced delays in feedback in the Philippines. Similarly, in Malaysia, Ghavifekr and Ibrahim (2024) reported that ICT-proficient heads of departments improved communication flow and teacher job satisfaction.

In Africa, Emanuel and Mwila (2023) discovered that digital monitoring improved managerial transparency in Tanzanian secondary schools, while Kusi, Keelson, and Adzifome (2019) found that head teachers' use of ICT enhanced teacher retention in Ghana. These findings highlight ICT's role in building a culture of accountability and continuous professional growth.

In Nigeria, empirical evidence remains sparse. Ibrahim, Azhar, and Muhammad (2024) showed that ICT competence among principals improves managerial performance, yet the direct link between supervisors' ICT competence and effective monitoring is still underexplored. Obi, Offu, and Otu (2024) emphasized that poor supervisory skills and minimal ICT use hinder teacher effectiveness, while Yahaya and Bolaji (2023) found that many supervisors lack digital confidence. This gap in literature underscores the need for empirical investigation into how ICT competence shapes the quality, frequency, and outcomes of educational monitoring in Nigerian public secondary schools.

Methodology

This study employed a quantitative descriptive survey design to examine the relationship between ICT competence of school supervisors and effective educational monitoring in Lagos State public secondary schools. The design enabled the researcher to gather and analyze data from a large population using SPSS version 23.0 for statistical testing. The study population consisted of 210 school supervisors, from which a sample of 136 was determined using Yamane's (1967) formula. A stratified random sampling technique ensured fair representation across the six education districts. Data were gathered using a structured *questionnaire titled Supervisors' ICT Competence and Educational Monitoring Questionnaire (SICTEMQ),* divided into three sections covering demographic data, ICT competence, and educational monitoring effectiveness. Experts confirmed the instrument's content validity, while reliability was established through a pilot study yielding Cronbach's Alpha values of 0.87 and 0.82, indicating high internal consistency. Questionnaires were personally administered after obtaining ethical approval and informed consent, achieving a 92.6% response rate. Data analysis involved descriptive statistics (mean, standard deviation) and inferential tests (Pearson correlation and multiple regression) at a 0.05 significance level. Ethical principles of confidentiality, voluntariness, and anonymity were strictly maintained throughout the study.

Data Analysis and Interpretation

This chapter presents and analyzes data collected on the role of ICT competence of school supervisors in enhancing effective educational monitoring in Nigerian public secondary schools. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23.0. The analysis included descriptive statistics (frequencies, means, and standard deviations) and inferential

statistics (correlation and regression analyses) to test the study's hypotheses at a 0.05 level of significance. Out of 136 questionnaires distributed, 126 valid responses were retrieved and analyzed, giving a response rate of 92.6%, which was deemed adequate for reliable statistical inference.

Bio-Data Characteristics of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	68	54.0
	Female	58	46.0
Years of Supervisory Experience	1–5 years	32	25.4
	6–10 years	47	37.3
	Above 10 years	47	37.3
Educational Qualification	B.Ed	41	32.5
	M.Ed	62	49.2
	Ph.D	23	18.3
Education District	District I	21	16.7
	District II	18	14.3
	District III	23	18.3
	District IV	19	15.1
	District V	22	17.5
	District VI	23	18.1

Source: Field Survey, 2025

The demographic results show that the respondents were fairly distributed across the six education districts. A majority (74.6%) of the supervisors had over six years of experience, indicating substantial professional exposure. Most respondents (49.2%) held Master's degrees, suggesting a relatively high level of academic qualification and potential familiarity with ICT-related concepts.

Descriptive Analysis of Major Variables

Variable	N	Mean ($\bar{x}$)	Std. Deviation	Remark
ICT Competence of Supervisors	126	3.91	0.63	High
Effective Educational Monitoring	126	3.84	0.71	High
ICT-Based Supervision Tools	126	3.76	0.68	Moderate–High
Challenges of ICT Integration	126	3.42	0.77	Moderate

Interpretation:
The results indicate that school supervisors demonstrated a high level of ICT competence (Mean = 3.91), suggesting adequate digital literacy and familiarity with ICT tools. Educational monitoring effectiveness was also rated high (Mean = 3.84), implying that ICT use may positively influencing monitoring outcomes. However, challenges such as inconsistent internet connectivity and a lack of government-provided ICT infrastructure remained moderately significant.

Test of Hypotheses

Hypothesis One

H_{01}: There is no significant relationship between school supervisors' ICT competence and effective educational monitoring.

Variables	N	r	Sig. (2-tailed)	Decision
ICT Competence & Educational Monitoring	126	0.684**	0.000	Reject H_{01}

The Pearson correlation coefficient ($r = 0.684$, $p < 0.05$) indicates a strong positive relationship between ICT competence and effective educational monitoring. This implies that supervisors who are more competent in ICT are better able to carry out timely, accurate, and efficient monitoring tasks. The null hypothesis (H_{01}) is therefore rejected. This result aligns with findings by Gerona and Bautista (2022) and Ibrahim, Azhar, and Muhammad (2024), who emphasized that ICT skills significantly enhance supervisors' management performance and feedback efficiency.

Hypothesis Two

H_{02}: ICT-based supervision tools have no significant influence on the quality and timeliness of educational monitoring outcomes.

Model Summary		R	R^2	Adjusted R^2	Std. Error
ICT Tools → Monitoring Effectiveness		0.611	0.373	0.367	0.512
ANOVA Table	**df**	**F**	**Sig.**		
Regression	1	73.289	0.000		
Residual	124				
Total	125				

Interpretation:
The regression results ($F = 73.289$, $p < 0.05$) show that ICT-based supervision tools significantly

influence monitoring outcomes, explaining 37.3% of the variance in effective educational monitoring. Hence, the null hypothesis is rejected. This supports Wiyono et al. (2022) and Astuti and Nur (2025), who found that integrating digital supervision systems enhances supervision quality, particularly through real-time feedback and online reporting platforms.

Discussion of Findings

The findings revealed that ICT competence is a critical enabler of effective educational monitoring. Supervisors who possess higher ICT skills are more capable of using e-monitoring systems, digital data management tools, and communication platforms for real-time supervision. This outcome is consistent with Kamilatun et al. (2024) and Obi, Offu, and Otu (2024), who emphasized the transformative power of ICT in improving supervisory effectiveness and teacher accountability.

Additionally, ICT-based tools were shown to significantly enhance monitoring quality and timeliness, underscoring the role of digital innovation in fostering transparency and responsiveness in school management. However, persistent challenges—such as poor infrastructure and limited ICT training- still constrain supervisors' full utilization of technology. The results affirm that ICT competence among school supervisors is both a predictor and a prerequisit**e** for effective educational monitoring in Nigeria's evolving educational landscape.

Conclusion

The findings underscore that ICT competence is no longer optional for school supervisors—it is an essential professional skill for effective educational monitoring in the 21st century. Supervisors who are ICT-literate are better equipped to manage digital supervision platforms, analyze real-time data, and provide constructive feedback that supports teaching and learning improvement. However, the study also highlights the digital divide that continues to affect supervisory functions in Nigerian schools. Without adequate infrastructure, training, and policy support, the potential of ICT to transform school supervision will remain underutilized. Hence, the study concludes that enhancing supervisors' ICT competence through continuous capacity building, provision of digital infrastructure, and supportive government policies is vital for achieving sustainable quality assurance in the Nigerian education system.

Recommendations

Based on the findings, the following recommendations are made:

6. The Ministry of Education should organize periodic ICT training workshops and refresher programs to strengthen supervisors' digital literacy and application skills.
7. Government and education stakeholders should ensure adequate provision of ICT tools (computers, internet access, and mobile monitoring devices) across all education districts to facilitate real-time supervision.
8. Educational supervision policies should explicitly incorporate ICT-based monitoring frameworks, ensuring that performance evaluations and reports are digitized for efficiency and accountability.
9. Supervisors who demonstrate innovative ICT use in monitoring should be recognized and rewarded to encourage wider adoption among their peers.
10. Collaboration with ICT companies and NGOs should be encouraged to provide affordable software solutions, technical support, and continuous system upgrades.
11. Efforts should be made to mitigate infrastructural challenges, such as power instability and poor connectivity, by investing in renewable energy sources and stable broadband networks for educational offices.

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