



DIGITAL LEADERSHIP COMPETENCIES AND SUSTAINABLE SECONDARY SCHOOL ADMINISTRATION IN ANAMBRA STATE, NIGERIA

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ABSTRACT

This study examined digital leadership competencies and sustainable secondary schools' administration in Anambra State, Nigeria. The study adopted a cross-sectional correlational research design. The population comprised 268 principals in all the 268 public secondary schools in Anambra State. A multi-stage sampling procedure was used to select a sample of 200 principals (63 males and 137 females), which represents 75% of the respondents. This was determined by Taro Yamane Formula, which gave a minimum sample size of 160. Two self-developed structured rating scales were used as instruments for data collection: 18-item Digital Leadership Competencies Questionnaire (DLCQ) and 10-item Sustainable School Administration Questionnaire (SSAQ). Both instruments were designed on a four-point modified Likert scale and were duly validated by five experts in Educational Management and Measurement and Evaluation. The internal consistency of the instruments was established using Cronbach's Alpha method. The reliability yielded coefficients values of 0.75 for the DLCQ and 0.82 for the SSAQ, with an overall reliability index of 0.79. The research questions were answered using mean and standard deviation while Pearson's Product Moment Correlation Coefficient at a 0.05 level of significance was used to test the null hypotheses. The findings showed there was significant positive relationship between digital leadership competencies and sustainable school administration. The study concluded that digital leadership competencies are critical determinants of sustainable school administration. Based on the findings, it is recommended among others, that Anambra State Ministry of Education should institutionalise continuous professional development programmes for principals on digital competencies in order to enhance their digital literacy which is essential for fostering sustainable secondary school administration.

Keywords: digitalisation, leadership, competency, sustainability and administration



Introduction

The adoption and integration of digitalisation into the secondary education system in Nigeria, and in particular, Anambra State has created a growing need for sustainable educational advancement. In this age of digital transformation, effective school administration requires principals to possess adequate digital competencies needed to adapt to disruptive technologies and sustain effective school administration. This position aligns with the findings of Mba and Adieme (2024), Anyaeji et al; (2025), who reported that the sustainability of digitalisation in secondary education largely depends on how effectively principals manage and utilise digital technologies in school administration. Existing studies have also shown that principals require not only managerial skills but also the competencies to integrate technology into decision-making, communication, instructional supervision, innovation and organisational sustainability (Adenubi & Oyenuga, 2025; Agusiobo, 2025; Akudo, 2025; Obiekezie et al., 2025; Okeke et al., 2025). Digital leadership competencies refer to the knowledge, skills and attitudes required by school administrators to effectively integrate digital technologies into school management, teaching, communication and decision-making processes to improve learning outcomes and organisational effectiveness. Renda (2026) defined digital leadership competencies as a combination of technological knowledge, managerial skills and interpersonal abilities that enable leaders to effectively coordinate digital transformation processes in organisations. Thus, the current digital revolution requires principals to possess strong digital competencies that can enable them to integrate technologies and manage data effectively so as to attain the educational goals and objectives.

Digital leadership competencies are widely viewed as multidimensional. They include but not limited to: digital transformation skills, digital literacy and fluency, digital communication, instructional supervision in digital settings, virtual collaboration, data-driven decision-making, cybersecurity awareness, data management, and the ability to build a strong digital culture within organisations (Grenda, 2025; Hamzah et al., 2021; Okunlola & Naicker, 2025; Van Wart et al., 2019). In education, these competencies are very vital because school leaders are responsible for managing digital systems used in administration, teaching, supervision and stakeholder engagement. Research has consistently established that digital leadership competencies are measurable indicators that shape how schools effectively respond to digital transformation (Dogan & Aytac, 2025). Hamzah et al. (2021) found that leaders' digital skills significantly improve organisational performance. Similarly, Klus and Muller (2021) noted that digital leaders combine traditional leadership abilities with digital skills to manage complex, technology-driven environments. The study conducted by Sam-Kalagbor and Chimezie (2025) further revealed that principals with strong digital leadership competencies are more effective in improving efficiency, strengthening instructional supervision and promoting a positive digital school culture. These digital competencies are therefore critical not only for improving school effectiveness in the present digital era but also for ensuring its sustainability.

Sustainable school administration in this era of digitalization requires adaptive leadership and digital skills. Principals are expected to integrate digital tools into administrative and teaching-learning processes to improve efficiency, strengthen managerial decision-making, and ensure continuous professional development that aligns with global best practices (2023) posited that leaders must continually adjust their leadership approaches to effectively use new digital



tools in order to remain competitive in a global context. Existing studies have shown that digital leadership plays a pivotal role in the adoption and integration of modern digital technologies that support the smooth and effective management of school administration (Aslam et al., 2020; Yang et al., 2025). Similarly, Adenubi and Oyenuga (2025) observed that data-driven practices, digital collaboration, and effective communication enable school administrators to address challenges associated with the sustainability of digitalisation. In a related study, Banoglu et al. (2023) found that school leaders were able to streamline administrative functions, enhance supervision and build a culture of continuous improvement through the use of digital systems. Conversely, schools that fail to adapt to digital demands risk inefficiencies, poor service delivery and reduced institutional competitiveness (Shin et al., 2023). It has also been documented that for schools to survive the current wave of digitalisation, school administrators must adapt to change (Pribadi et al., 2024) and effectively manage the integration of technologies in educational processes (Zhong, 2017). Thus, the sustainability of secondary school administration in this era of digitalisation is determined by principals' digital leadership competencies.

Theoretical Framework

This study is hinged on the Technological Pedagogical Content Knowledge (TPACK) Framework, which was developed by Mishra and Koehler in 2006. The framework provides a strong theoretical foundation for examining how digital leadership competencies contribute to sustainable school administration in a digitalised education system. The theory explains the complex interplay among the three core components: content knowledge (CK), pedagogical knowledge (PK) and technological knowledge (TK). It posits that effective teaching in a digital age requires more than knowledge mastery; rather, it requires the meaningful integration to support effective instruction. Within this framework, school administrators and teachers are expected to understand how technology can be used to represent subject content in ways that enhance teaching and learning, while also applying appropriate pedagogical strategies that align with learners' needs. School principals, as instructional leaders, are expected to integrate technological tools with appropriate pedagogical and content-related understanding to support teaching effectiveness, improve instructional supervision and enhance digital transformation. Hence, the TPACK framework is relevant for this study because it underscores the importance of digital competence in educational leadership and administration.

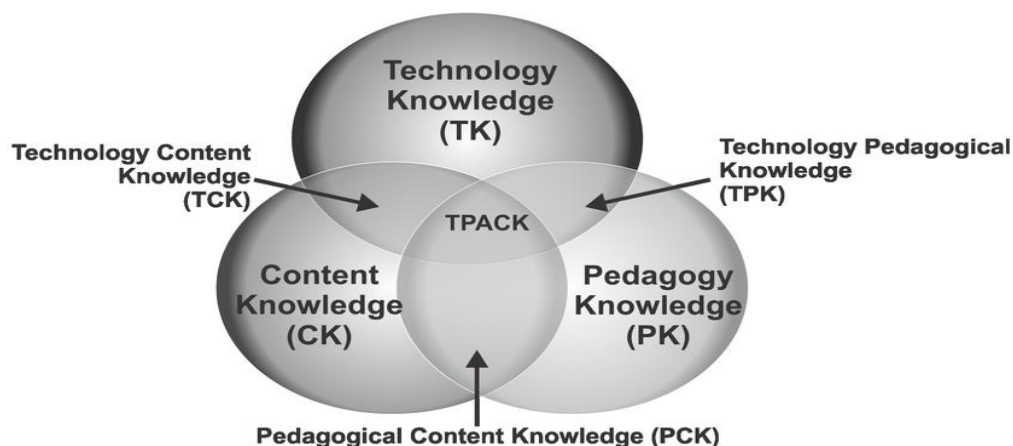


Figure 1: Technological Pedagogical Content Knowledge (TPACK) Framework

Source: Adopted from Mishra and Koehler (2006).

Literature Review

Digital Decision-Making Competency and Sustainable School Administration

Digital decision-making competency refers to the ability of school administrators to utilise digital technologies and Management Information Systems (MIS) to access and interpret information for timely, accurate and strategic administrative decision-making. Principals are expected to employ digital platforms, educational management information systems (EMIS), online communication channels and analytics tools to improve planning, coordination, monitoring and institutional effectiveness. Sustainable school administration, on the other hand, requires school leaders to make informed decisions that ensure long-term institutional stability, accountability, adaptability and continuous improvement. Research has consistently shown that effective digital decision-making competency is indispensable for sustainable school governance and administration (Dogan & Aytac, 2025; Ezema & Ekwe, 2025; Manafa, 2020). Forrester (2019) observed that school management information systems support timely and quality decision-making in schools when administrators possess the competence to utilise digital data effectively. Similarly, Okeke et al. (2025) found that digital decision-making competencies significantly enhance administrative effectiveness. In a related study, Adenubi and Oyenuga (2025) developed a framework for real-time data-driven decision-making in the Nigerian public basic school system and discovered that EMIS improved administrative accuracy, monitoring processes, policy implementation and institutional responsiveness. The findings of Oredein and Obadimeji (2022) also revealed that digital data systems support sustainable educational administration by reducing delays associated with manual administrative processes, and improving evidence-based decision-making.

Extant studies have also shown that school administrators who effectively utilise data-driven systems are better positioned to make strategic and informed decisions that enhance organisational effectiveness (Ikemoto & Marsh, 2007; Orunbon et al., 2025). Similarly, Grenda (2026), Sisu (2023) and Anyaeji et al. (2025) found that organisational success in the digital era is significantly influenced by leaders' digital competencies, particularly their ability to integrate data into routine managerial decision-making processes. Thus, this suggests a significant



relationship between principals' digital competence and the sustainability of school administration, as effective digital engagement strengthens decision quality, administrative efficiency and institutional responsiveness. However, empirical findings within the Nigerian context reveal persistent challenges in this regard. Several studies indicate that many school administrators still exhibit limited digital literacy and fluency; thereby, constraining the effective adoption of digitalisation in school management. For instance, Obineme and Aguba (2025) found that the extent of principals' use of information and communication technology (ICT) for effective management in Anambra State was very low. Likewise, Okeke et al. (2025) reported that although principals demonstrate moderate ICT competence, they struggle to apply digital systems for data-driven decision-making that supports long-term institutional sustainability in Anambra State. Similarly, Mba and Adieme (2024) discovered that while principals in Rivers State utilise computers for basic record keeping, they rarely apply digital tools for strategic decision-making. In a related study, Obiekezie and Anyanwu (2019) observed that the use of management information systems (MIS) in public secondary schools in Anambra State is largely confined to routine administrative tasks rather than decision-support functions.

Digital Instructional Supervision Competency and Sustainable School Administration

Digital instructional supervision competency refers to the ability of school administrators to utilise digital technologies in supervising instruction, monitoring teachers' classroom practices, evaluating teaching effectiveness, providing feedback and supporting professional development. Veithzal and Rony (2024) posited that digital leaders should provide supportive environments that will inspire staff members to adopt and integrate digital tools in their daily tasks for optimal performance. Hamzah et al. (2021) observed that the integration of digital technologies into instructional supervision has transformed traditional supervisory practices by enabling virtual classroom observations, online feedback systems, electronic monitoring and technology-supported teacher evaluation. Effective instructional supervision remains central to sustainable school administration because it contributes to teacher effectiveness, instructional quality, organisational improvement, and long-term educational outcomes (Okunola & Naicker, 2025). Aslam et al. (2020) found that digital instructional supervision has simplified tasks for school leaders as they can channel the time for classroom visitation to other pressing needs. Similarly, Orunbon et al. (2023) discovered that principals' digital transformational leadership during crisis situations such as the COVID-19 pandemic positively influenced teachers' commitment and job performance in Lagos State.

Research has consistently demonstrated that instructional supervision significantly contributes to effective school administration and educational quality. For example, Nwideduh and Adieme (2021) observed that principals with digital instructional competency effectively utilise closed-circuit television (CCTV) systems to monitor teachers' and students' classroom activities while simultaneously performing other administrative responsibilities. Similarly, Obidile (2025) found that principals that possess digital competency support teachers' digital pedagogical growth sharing model lesson plans and instructional resources via their e-mails. In a related study, Eze (2025) discovered that digital competency positively and significantly predicts teachers' classroom technology integration. Likewise, Sisu (2023) reported that school administrators leverage on their digital competencies to generate performance data that can



enable them to identify trends in teaching effectiveness, curriculum coverage and student engagement. Dogan and Aytac (2025) also examined principals' instructional e-supervision and digital leadership, and found that technology-supported instructional supervision enhanced teachers' professional digital competence and educational effectiveness. Hence, when principals adopt digital instructional supervision, they can simultaneously monitor teachers' classroom activities, enhance instructional practices, and effectively perform administrative responsibilities.

Statement of the Problem

The rapid evolution of digital technologies and their transformative impact on educational processes globally have made it imperative for principals to acquire relevant digital competencies for effective and sustainable school administration. In this digital era, principals are expected not only to perform traditional administrative functions but also to integrate digital technologies into instructional supervision, communication, decision-making, data management, staff coordination, and school monitoring processes. These competencies are essential for ensuring sustainable school culture and the attainment of educational goals. In Nigeria, the secondary education system has witnessed various reforms aimed at promoting digitalisation. However, despite these reforms, many principals in Anambra State appear not to possess adequate digital competencies required for the effective adoption and integration of modern digital tools in school administration. More worrisome is the fact that many principals still rely heavily on conventional administrative methods despite the increasing availability of digital technologies in the education sector. This situation may undermine the ongoing digitalisation reforms and the long-term sustainability of school administration in secondary schools. Furthermore, the researchers' observations during teaching practice supervision visits to secondary schools indicate that some principals lack adequate digital competencies in the use of digital tools for instructional supervision, virtual communication, electronic record keeping, digital decision-making, data-driven administration, among others.

Aim and Objectives of the Study

The aim of this study was to establish the relationship between digital leadership competencies and sustainable secondary schools' administration in Anambra State, Nigeria. Specifically, the study sought to:

1. ascertain the relationship that exists between principals' digital decision-making competency and sustainable secondary schools' administration in Anambra State, Nigeria; and
2. determine the relationship that exists between principals' digital instructional supervision competency and sustainable secondary schools' administration in Anambra State, Nigeria.

Research Questions

The following research questions guided this study:

1. What is the relationship that exists between principals' digital decision-making competency and sustainable secondary schools' administration in Anambra State, Nigeria?



2. What relationship exists between principals' digital instructional supervision competency and sustainable secondary schools' administration in Anambra State, Nigeria?

Hypotheses

The following null hypotheses were formulated at 0.05 level of significance:

- Ho₁ There is no significant relationship between principals' digital decision-making competency and sustainable secondary schools' administration in Anambra State, Nigeria.
- Ho₂ There is no significant relationship between principals' digital instructional supervision competency and sustainable secondary schools' administration in Anambra State, Nigeria.

Methodology

This study adopted a cross-sectional correlational research design. This design is appropriate because it allows the researchers to examine the relationships among the variables simultaneously at a single point in time without manipulating any of the variables. The population comprised 268 principals in all the 268 public secondary schools in Anambra State. Taro Yamane's formula was used to determine a minimum sample size of 160; hence, a sample of 200 principals, which represents 75% of the population was drawn using multi-staged sampling procedure. At the first stage, the principals were stratified into educational zones. At the second stage, simple random sampling technique was used to select a number of Local Government Areas (LGAs) from each educational zone. This was done through balloting without replacement. The names of all the LGAs in each education zone were written on pieces of paper, folded, mixed thoroughly, and randomly selected until the required number of LGAs was obtained from each zone. At the third stage, proportionate sampling technique was employed to determine the number of principals to be selected from each selected LGA based on the population of principals in the area. This ensured fairness and proportional representation. At the fourth stage, simple random sampling technique through balloting was again used to select the required number of principals from the sampled secondary schools in the selected LGAs. Each principal's name was assigned a number and the numbers were randomly selected until the required sample size of 200 principals was obtained.

Two self-developed structured rating scales were used as instruments for data collection: Digital Leadership Competencies Questionnaire (DLCQ) Sustainable School Administration Questionnaire (SSAQ). DLCQ contained 18 items with nine items each for the two constructs (digital decision-making competency and digital instructional supervision competency), while SSAQ contained 10 items, which measured sustainable school administration in secondary schools. The questionnaire items were structured on a 4-point rating of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD), and weighted 4, 3, 2 and 1 respectively. The instruments were subjected to face and content validation by five experts in the Departments of Educational Technology, Faculty of Education, Federal University of Oye-Ekiti, Ekiti State and Educational Management, Faculty of Education, Nnamdi Azikiwe University Awka, Anambra State. The internal consistency of the instruments was determined using the Cronbach Alpha method. The reliability analysis yielded coefficient values of 0.75 for the DLCQ and 0.82



for the SSAQ, with an overall reliability index of 0.79. Pearson's Product Moment Correlation Coefficient was used to answer the research questions and test the null hypotheses at the 0.05 level of significance using SPSS version 23. In answering the research questions, the coefficient r and the strength of the relationship were interpreted using the correlation coefficient scale proposed by Creswell (2014) as follows: 0.00-0.19 = weak correlation, 0.20-0.39 = fair correlation, 0.40-0.69 = moderate correlation, 0.70-0.89 = strong correlation, and 0.90-1.00 = very strong correlation.

Results

Table 1: Pearson's Product Moment Correlation Coefficient Analysis of Respondents' Opinions on the Relationship between Digital Decision-Making Competency and Sustainable Secondary Schools Administration in Anambra State, Nigeria

Variables	N	$\bar{X}$	SD	R	P	Decision
Principals' Digital Decision-making Competency	200	26.06	5.32	0.591	0.000	Positive Significant Relationship
Sustainable School Administration	200	31.85	3.99			

* Correlation coefficient is significant at $p < 0.05$

Table 1 shows the mean, standard deviation and Pearson's Product Moment Correlation analysis between principals' digital decision-making competency and sustainable secondary schools' administration in Anambra State, Nigeria. The results revealed that principals' digital decision-making competency had a mean score of 26.06 with a standard deviation of 5.32, while sustainable school administration had a mean score of 31.85 with a standard deviation of 3.99 among the 200 respondents. The correlation (r) of 0.591 indicates a moderate positive relationship between principals' digital decision-making competency and sustainable school administration. The probability value of 0.000 is less than the 0.05 significance level ($r = 0.59$, $p < .05$); therefore, the null hypothesis which states there is no significant relationship between principals' digital decision-making competency and sustainable secondary school administration is rejected. Thus, there is a significant positive relationship between principals' digital decision-making competency and sustainable secondary schools' administration in Anambra State, Nigeria.



Table 2: Pearson's Product Moment Correlation Coefficient Analysis of Respondents' Opinions on the Relationship between Principals' Digital Instructional Supervision Competency and Sustainable Secondary Schools' Administration in Anambra State, Nigeria

Variables	N	$\bar{X}$	SD	r	P	Decision
Principals' Digital Instructional Supervision Competency	200	28.68	5.15	0.667	0.000	Strong Positive Significant Relationship
Sustainable School Administration	200	31.85	3.99			

* Correlation coefficient is significant at $p < 0.05$

Table 2 shows the mean, standard deviation and Pearson's Product Moment Correlation analysis between principals' digital instructional supervision competency and sustainable secondary schools' administration in Anambra State, Nigeria. The results revealed that principals' digital instructional supervision competency had a mean score of 28.68 with a standard deviation of 5.15, while sustainable school administration had a mean score of 31.85 with a standard deviation of 3.99 among the 200 respondents. The correlation (r) of 0.667 showed a strong positive and significant relationship between principals' digital instructional supervision competency and sustainable school administration. The probability value of 0.000 is less than the 0.05 significance level ($r = 0.67$, $p < .05$); therefore, the null hypothesis which states there is no significant relationship between principals' digital instructional supervision competency and sustainable secondary schools' administration is rejected. Thus, there is a strong positive and significant relationship between principals' digital instructional supervision competency and sustainable secondary schools' administration in Anambra State, Nigeria.

Discussion of Findings

The finding of this study revealed a positive and significant relationship between principals' digital decision-making competency and sustainable secondary schools' administration in Anambra State, Nigeria. This finding has implications for educational policy and implementation, as it shows that principals who possess digital decision-making competencies foster effective and sustainable school administration. This finding is in agreement with Sisu (2023); Anyaeji et al, (2025), who found that organizational effectiveness in this digital era is significantly influenced by leaders' digital competencies to integrate data into routine managerial decision-making processes. It is also in line with Grenda (2026); Orunbon et al. (2025), who observed that school administrators who effectively utilise data-driven systems are better positioned to make strategic and informed decisions that enhance organisational success. The finding also supports the research by Dogan and Aytac (2025); Ezema and Ekwe(2025);Forrester (2019); Manafa(2020), who discovered that school administrators, who possess digital data competencies utilise MIS efficiently, which result in quality decision-making and optimal productivity. It also corroborates with Adenubi and Oyenuga (2025); Okeke et al. (2025); Oredein and Obadimeji (2022), who found that digital data systems support sustainable educational administration by



reducing delays associated with manual administrative processes, and improving evidence-based decision-making that leads to administrative effectiveness.

Another finding of this result revealed a strong positive and significant relationship between principals' digital instructional supervision competency and sustainable secondary schools' administration in Anambra State, Nigeria. This implies that principals who possess digital instructional supervision competencies can enhance the teaching-learning process and monitor instructional activities more effectively; thereby, fostering sustainable secondary school administration. This finding is in consistent with Dogan and Aytac (2025); Eze (2025); Obidile (2025), who discovered that principals' digital competencies positively and significantly predict teachers' classroom technology integration. The finding agrees with Hamzah et al. (2021), who observed that the integration of digital technologies into instructional supervision has transformed traditional supervisory practices by enabling virtual classroom observations, online feedback systems, electronic monitoring and technology-supported teacher evaluation. It is also in consonance with Aslam et al. (2020), Okunola and Naicker (2025), who found that digital instructional supervision has simplified tasks for school leaders as they can channel the time for classroom visitation to other pressing needs. The finding also aligns with Nwideeduh and Adieme (2021), who observed that principals with digital instructional competency effectively utilise closed-circuit television (CCTV) systems to monitor teachers' and students' classroom activities while simultaneously performing other administrative responsibilities. It is also in line with Sisu (2023), who reported that school administrators leverage on their digital competencies to generate performance data that enable them to identify trends in teaching effectiveness, curriculum coverage and student engagement.

Conclusion

Based on the findings of this study, it is concluded that principals' digital competencies are critical determinants of sustainable secondary schools' administration in Anambra State, Nigeria. There is no gainsaying that digitally competent principals achieve administrative effectiveness, and demonstrate efficiency in instructional leadership and supervision in this technology-driven era. Hence, the sustainability of secondary schools' administration in this digital era depends not only on availability of technological infrastructure but also on the abilities of principals to strategically utilise digital tools in managing school operations.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Anambra State Ministry of Education should institutionalise continuous professional development programmes for principals on digital competencies in order to enhance their digital literacy which is essential for fostering sustainable secondary school administration.
2. Principals should be provided with adequate digital instructional supervision tools and encouraged to utilise them effectively to improve the teaching-learning process and promote sustainable secondary school administration.



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