

# Decentralization of Electronic Record Systems for Improved School Record Management in Nigeria

Running Title: Decentralized ERKS in Nigerian Schools

Babagana Yahaya Aminu and Joyce W. Gikandi-Gitau

Research in Information Technology, Unicaf University, Malawi.

\*Corresponding author email: [yahayababaganamn2@gmail.com](mailto:yahayababaganamn2@gmail.com), Tel: +2347062335994

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### ABSTRACT

*In Nigeria, particularly in Katsina State, implementing electronic record-keeping systems (ERKS) has been slow and uneven. While these systems offer benefits for information management and data retrieval, public schools face challenges including limited technology, inadequate training, and resistance to change. This study employed a mixed-methods approach combining qualitative interviews and quantitative surveys. The evaluation assessed ERKS decentralization's impact on record-keeping, while the survey collected data from 364 participants using stratified random sampling across 34 Local Government Areas. Questionnaires were administered online as well the interviews were conducted online to maximize response rates and data quality. Quantitative data were analyzed using descriptive statistics and inferential tests (Chi-square and log-likelihood ratio). Both tests showed statistical significance ( $p < 0.001$ ), confirming that decentralized e-record management and improved information sharing significantly enhance record management efficiency. The Likert scale ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). Findings revealed respondents occasionally use computers for work (mean = 2.77), but rarely use smartphones (2.07) or tablets (2.38), primarily due to limited device availability and infrastructure constraints. Despite these limitations, most respondents who had exposure to or training in electronic systems strongly agreed ERKS would improve work efficiency (4.35), accuracy (4.39), and time savings (4.45). Qualitative interviews with 19 stakeholders confirmed electronic records improve efficiency, accuracy, and productivity. The study concludes that ERKS decentralization and enhanced information sharing significantly improve school record management, enabling faster data access, better decision-making, and improved administrative outcomes. However, successful implementation requires substantial investment in infrastructure (electricity, internet connectivity) and capacity building. It is recommended that the Ministry of Education and State Universal Basic Education Board encourage phased ERKS adoption in all schools, prioritizing infrastructure development, and develop clear policies on data privacy, security, and compliance.*

**Keywords:** *Electronic record-keeping systems, Decentralization, School record management, Digital transformation, Katsina State, Public Schools, Nigeria, Educational technology*



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## INTRODUCTION

Electronic record keeping is increasingly common across various sectors, including education. While many developed nations have made significant progress in transitioning to digital school record systems, many developing countries, especially in Africa, are still adapting. For example, in South Africa, universities are steadily adopting electronic records due to improved technological access and the recognized benefits of efficiency, accessibility, and data security (Alsharafat et al., 2023).

Effective record-keeping is critical in educational institutions, as school records serve as a "storehouse of useful information" for students, teachers, administrators and other stakeholders. In contrast, Nigeria's progress has been slow and inconsistent particularly in Katsina State. Although electronic record keeping holds promise for enhancing information management, retrieval, and long-term storage, implementation remains limited. Private schools in the region have made some advances, but public schools lag significantly due to technological constraints, limited staff training, and resistance to change. This gap reflects broader inequalities in access to digital tools and expertise (Kashaija, 2022). There is a lack of in-depth research on the challenges of electronic record management in northern Nigeria.

The limited adoption in public schools signals a need for targeted strategies to bridge the digital divide and fully harness the benefits of electronic record keeping in education. Furthermore, this study investigates how decentralization of electronic school record systems could assist towards enhancing record management practices in school record management in Katsina State, Nigeria. In this context, decentralization refers to granting individual schools greater autonomy over their record management operations, including local control over data entry, backup schedules, user permissions, and system maintenance, rather than relying solely on centralized education authority oversight. It focuses on identifying existing challenges and proposes strategies for more effective implementation.

The research is valuable for advancing knowledge of digital record systems in Nigerian schools and offers practical guidance for policymakers, administrators, researchers, and IT experts in adopting efficient data management solutions. This study therefore investigates the utility of decentralization of electronic school record systems in Nigerian schools to improve record management practices. In particular, we pose the following research questions:

1. What is the current status of record management and decentralization of electronic record systems in Nigerian schools?
2. What are the perceived benefits and challenges of decentralizing electronic record systems for school record management?

3. How do these decentralized systems influence the efficiency, security, and overall quality of record management in schools?

These sub-questions break down the main objective into clear targets for investigation, guiding both the quantitative and qualitative components of the research.

## Literature Review

Electronic record keeping is growing in education and other fields. Many industries, including education, are struggling to switch from manual to electronic record keeping in the digital age. This switch from paper to electronic record keeping could greatly improve school record management. Many schools in developed nations like the US and Canada use electronic record-keeping systems (Alsharafat et al., 2023). The necessity of efficiency, precision, and compliance with rules in all administrative and academic activities has increased the significance of skilled record management at educational institutions. This is because a higher level of efficiency, precision, and compliance is required. Internationally, the transition to electronic records management has shown varied success rates. In developed nations, such as the United States and United Kingdom, educational institutions have made substantial progress in digitalization, with studies by Rosak-Szyrocka, et al. (2022) showing high adoption rates. Asian countries like Singapore and South Korea have implemented comprehensive national e-governance systems that include educational records (Kibria & Hong, 2024).

In contrast, developing nations face unique challenges. Studies from sub-Saharan Africa by Salisu, Ndaro, and Busari (2024) reveal that while the benefits are recognized, implementation remains fragmented due to infrastructure limitations and resource constraints. Developed nations have quickly adopted electronic record management (e-record), but Africa has not. Universities in South Africa are increasingly using electronic records (Kashaija, 2022). South African universities are adopting electronic records due to the increased availability and accessibility of technology and the many benefits of electronic record-keeping, such as efficiency, accessibility, and security. Within Africa, the adoption of electronic records varies significantly. South African universities have made substantial progress, with Ngoepe and Mojapelo (2024) and Kashaija (2022) reporting improved efficiency and accessibility. Kenya's education sector has seen moderate success through government-led initiatives, though rural-urban disparities persist (Mutula & Wamukoya, 2009).

## Decentralization and Local Governance

Decentralization is basically about delegating decision making power from a central authority to more local levels.

Supporters of this approach believe that giving local organizations like schools more control can make public services run more smoothly and help them better address the specific needs of their community. In Nigeria, decentralization has been tried in different sectors to boost transparency and accountability, such as in how money is managed or how decisions are made (Suberu, 2022). In the context of school record management, decentralizing means allowing each school to have greater say over how their records are handled. This could help them respond faster to issues and make record-keeping systems that truly fit their own unique situations. Overall, research suggests that by bringing authority and resources closer to those who actually use and need them, schools could be empowered to manage their records more effectively. This approach could make processes more efficient, secure, and better suited to each school's needs.

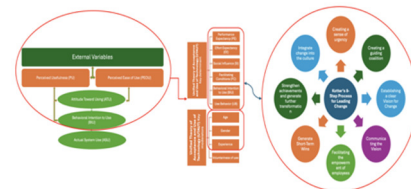
### Electronic Record Management Practices

Many studies have explored how Nigerian public organizations are transitioning to electronic records. For instance, Ukata and Wechie (2019) observed that moving to digital record-keeping has brought noticeable improvements in efficiency, collaboration, and timeliness within federal agencies. Electronic records make it easier to back up data and retrieve information quickly. In the university sector, Odewale et al. (2024) pointed out that many institutions in southwest Nigeria still juggle between old paper-based methods and new electronic systems. The prevailing diverse practices show that while digital options are available, traditional paperwork remains deeply rooted in everyday practice. Other research, such as the work by Muhammad et al. (2021), confirms that most public universities still rely heavily on manual record-keeping, largely because there's no clear, standardized policy guiding how records should be managed. Without such guidelines, schools tend to handle their records in inconsistent ways, highlighting the need for a unified system.

### Theoretical/Conceptual Framework

The theoretical framework for this study draws from three main theories: Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), and Kotter's 8-Step Process for Leading Change. TAM, developed by Davis (1989), explains user acceptance of technology through perceived usefulness and ease of use. The model explains how the adoption and utilization of information technology tools and systems can yield both immediate and long-term benefits for institutions and their personnel. UTAUT2 emphasizes the practical benefit (external incentive) that organizational users recognize after eliminating redundant or superfluous elements. Kotter's 8-Step Process provides a framework for managing organizational change, emphasizing the

importance of creating urgency, building a guiding coalition, and anchoring changes in organizational culture. These theoretical perspectives are integrated to understand how decentralization can facilitate technology acceptance and successful organizational change in school record management systems. The constructs from these theories were operationalized through survey items measuring perceived usefulness, ease of use, facilitating conditions, social influence, and change readiness (Figure 1). Overall, the literature brings out two main points. First, the positives of electronic records like making information easier to access which is the main accessibility factor, improving efficiency, and better protecting data are widely acknowledged. Second, major obstacles remain, such as the absence of strong policies, gaps in infrastructure, and not enough training for staff. These issues will shape how this research explores whether decentralizing electronic record management in schools can help maximize the benefits and overcome these persistent challenges.



**Figure 1:** Key elements adopted from TAM, UTAUT and Kotter's 8-Step Process

### MATERIALS AND METHODS

The materials and methods are a vital part of any research design, as it outlines how the study is executed and the tools or procedures employed. It demonstrates the systematic and rigorous approach used in conducting the research, offering sufficient detail for replication by other researchers. This clarifies how data were collected, the instruments utilized, and the rationale behind selecting specific methodologies. This study adopts a mixed-method research design, integrating both qualitative and quantitative primary data collection techniques. It combines elements of evaluation research and survey research. The evaluation component examines the progression of electronic record system decentralization and its role in improving record-keeping in Nigeria. Meanwhile, the survey aspect involves collecting and analyzing quality data from a representative sample of the target population. Given the dual nature of the design, the framework for ensuring data quality introduces certain constraints in evaluating the trajectory of decentralization of electronic records systems towards enhancing electronic record-keeping systems in Katsina State schools. In the survey segment, the research prioritizes the collection of high-quality, sufficient, and relevant data. Core elements such as questionnaire design, sampling

techniques, efficient fieldwork, and quality control are recognized as the foundation of survey-based research, collectively referred to as survey quality. This research applies a mixed-methodology, combining descriptive survey methods and evaluation strategies. The quantitative component involves the use of structured questionnaires for data collection, while the qualitative aspect employs in-depth interviews (IDI) to further verify and enrich the findings. Additionally, statistical analysis and data analytics form a central pillar of the research design, encompassing both the sampling plan and estimation procedures. The sampling plan details the strategy and techniques used to draw a representative sample from the broader population. Estimation procedures refer to the formulas applied to derive reliable estimates of population parameters from the sample and assess their accuracy (Levy & Lemeshow, 2015).

### Target Population and Sampling

The target population includes all public primary and secondary schools across urban and rural areas in Katsina State. Urban schools are generally better equipped technologically, whereas rural schools often encounter difficulties due to limited internet connectivity, inadequate staff training, and unreliable electricity. As summarized in (Table 1), the participants were selected from various administrative levels: state, local government, and individual schools. A stratified random sampling technique was employed to select 364 participants.

**Table 1:** Target Population and Sample.

Strata	Population Size	Sample Size
Public Primary Schools	2,918	255
Public Secondary Schools	516	85
State/LGA Education Officers	68	24
Total	3,670	364

### Sampling Design

The Stratified Cluster Sampling Design (SCSD) was employed for the study due to its ability to yield a robust and representative sample. This approach combines elements of both stratified sampling and cluster sampling. The population was first stratified, and within each stratum, clusters were independently sampled. In this study, the 34 Local Government Areas (LGAs) of Katsina State served as the strata. A one-stage cluster sampling technique was then applied within each LGA, with equal allocation across all strata. Within each stratum, specific participant categories were randomly selected from the Katsina State List of Schools database (sampling frame). Details of the selected individuals were recorded, and the random selection process was completed prior to data collection. Only the individuals selected through this process were

included in the actual data collection, and selection followed an optimum allocation strategy to ensure efficiency and balance.

### Data Collection Procedure

Data collection occurred in two phases over a one-month period. Phase one involved distributing structured online questionnaire to 364 participants across the 34 LGAs. The Questionnaires were administered online to maximize response rates and data quality. Phase two consisted of in-depth interviews with 19 key stakeholders, including Education Management Information System officers, IT personnel, and education ministry officials. Interviews were conducted using a semi-structured guide, audio-recorded with consent, and transcribed verbatim using Google Meet online meeting platform.

### Validity and Reliability

To ensure validity, the research instruments underwent expert review by five specialists in educational administration and information systems. Content validity was established through alignment with research objectives and theoretical frameworks. To measure the level of validity of the questionnaires, Kendall's coefficient of concordance (Kendall's W) was used. Kendall's W is a statistical measure of agreement between multiple raters that takes on values between 0 and 1 inclusive. Sample was collected from a pilot group of 60 participants. Kendall's W of 0.644 ( $p < 0.05$ ) was obtained from the questionnaire assessing the impact of electronic record keeping on record management practices in schools in Katsina State. Consequently, the instruments are anticipated to accurately measure their intended variables in this study. This ensures that we can utilize the results to make inferences about the population with a high degree of precision and confidence. On the reliability of the tools, Cronbach's alpha was calculated to assess internal consistency. Cronbach's alpha examines the correlation between individual items and the overall scale score. The formula that determines Cronbach's alpha is simple and makes use of the number of variables or question items  $N$  the variances  $S_i^2$  and the covariances  $S_{ik}$ . This is further described as follows:

$$\begin{aligned} \sum S_i^2 &= \text{Sum of the individual sample variances.} \\ \sum S_{ik} &= \text{Sum of the pairwise sample covariance.} \\ \bar{S}_{ik} &= \text{Average pairwise sample covariance.} \\ \alpha &= \frac{N^2 \bar{S}_{ik}}{\sum S_{ik} + \sum S_i^2} \end{aligned}$$

A pilot survey was conducted with 60 participants to test the instrument. Reliability analysis was conducted for each theoretical construct separately to ensure measurement quality:

Perceived Usefulness (6 items):  $\alpha = 0.89$   
 Perceived Ease of Use (5 items):  $\alpha = 0.87$   
 Facilitating Conditions (4 items):  $\alpha = 0.82$   
 Social Influence (4 items):  $\alpha = 0.85$   
 Change Readiness (5 items):  $\alpha = 0.88$

All constructs demonstrated high internal consistency reliability ( $\alpha > 0.80$ ), indicating that the instrument can provide dependable results for assessing electronic record-keeping and management practices in schools.

### Statistical Analysis Procedures

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondents' characteristics and overall data trends. For inferential analysis, chi-square test and log-likelihood ratio test were applied to examine the relationship between decentralization of e-record management and record management effectiveness. Effect sizes were calculated using Cramér's *V* to assess the practical significance of significant findings. All data were analyzed using IBM SPSS Version 26. Prior to analysis, data cleaning procedures were carried out to identify and correct errors, thereby enhancing the accuracy and reliability of the collected responses. Qualitative data from interviews were analyzed using thematic analysis following Braun and Clarke's (2006) six-phase framework. Transcripts were coded inductively, identifying patterns and themes relevant to the research questions. Initial codes were reviewed and refined through iterative analysis. Intercoder reliability was established through independent coding of 20% of transcripts by two researchers, with Cohen's kappa = 0.82 indicating substantial agreement. Data saturation was reached after 17 interviews, with two additional interviews conducted for confirmation. Three main themes emerged: (1) Decentralization and local control, (2) Perceived benefits of electronic systems, and (3) Implementation challenges.

### Ethical Considerations

Every aspect of this research was ethical, following the University Research Ethics Committee (UREC) guidelines and international best practices for educational research. Ethics approval was obtained from UNICAF University Research Evaluation Committee. Due to the sensitivity of human subject research, especially in educational settings, a comprehensive ethical framework was created to protect participants, ensure research integrity, and disclose results. The highest priority was given to maintaining confidentiality and anonymity. The systematic use of coded identifiers anonymized all participant data. This approach was followed throughout data collection, analysis, and reporting. The coded system protected participant privacy and built trust by tracking and analyzing data without revealing identity.

1. Data Protection and Storage: The study implemented strong data protection and storage measures to ensure data security and integrity. Physical records were locked in cabinets and digital files were stored on encrypted, password-protected drives accessible only to research team members.

2. Data Protection Regulations: The study strictly adhered to national and institutional data protection regulations. The research followed Nigeria's Data Protection Regulation (NDPR) and other local policies to responsibly and legally manage personal data (Kitchin, 2021).

This research protects participant rights and improved its validity and reliability. This study's ethical framework models responsible research practice and contributes meaningfully to educational research.

### RESULTS

The results are hereby presented through summary statistics in frequency tables, along with analytical tables for deeper insights (Table 2). The presentations of the summary statistics of the original data sets in form of frequency tables as well as the analytical tables are as follows.

**Table 2:** Gender of the Respondents.

Gender	Frequency	Percent
Male	340	93.4%
Female	24	6.6%
Total	364	100.0%

From Table 2, it can be deduced that 93.4% of the respondents were males while only 6.6% of them were females. From Table 3, it can be deduced that 42.0% of the respondents had NCE while 45.9% of them had a degree, among others. From Table 4, it can be deduced that 85.7% of the respondents had no access to desktop computers while 77.5% of them had no access to laptops, among others. These findings highlight significant infrastructure challenges that limit current use of electronic systems. From Table 5, it can be deduced that 81.9% of the schools had no internet connection while 82.4% of the schools had no electricity, among others. These infrastructure deficits represent major barriers to current ERKS implementation. The following inferential statistical analysis was used to test the research hypothesis at the 5% level of significance. The objective is to assess the trajectory of decentralization and information shareability of electronic records on record management practices. Hence, the following statistical hypothesis will be statistically tested through the chi-square test and log-likelihood ratio test.

**Table 3:** Educational Qualifications of the Respondents.

Qualifications	Frequency	Percent
TC II	3	0.8%
NCE	153	42.0%
BSc/B. Ed	167	45.9%
M. Ed	15	4.1%
Others	26	7.1%
Total	364	100.0%

**Table 4:** Access of Digital Devices.

Devices	Available		Not Available	
	N	%	N	%
Desktop Computer	52	14.3%	312	85.7%
Laptop	82	22.5%	282	77.5%
Tablet	131	36.0%	233	64.0%
Smartphone	157	43.1%	207	56.9%

**Table 5:** Digital Services in the Schools.

Services	Yes		No	
	N	%	N	%
Internet connection	66	18.1%	298	81.9%
Electricity	64	17.6%	300	82.4%
Electronic record keeping system	5	1.4%	359	98.6%

**Table 6:** Chi-square and Log-Likelihood Ratio Test for Research Hypothesis 3

Record Management	Tests	Value	df	<i>p-value</i> (2-sided)
Decentralization	Pearson Chi-Square	575.370	16	0.000
	Likelihood Ratio	273.625	16	0.000
Information Sharing	Pearson Chi-Square	636.730	16	0.000
	Likelihood Ratio	263.406	16	0.000

## Hypothesis Testing

**H0:** Decentralization of e-record management and the ability to share information do not significantly influence the overall effectiveness and efficiency of record management practices in Katsina State.

**H1:** Decentralization of e-record management and the ability to share information significantly influence the overall effectiveness and efficiency of record management practices in Katsina State.

From Table 6, since  $p < 0.001$  for both the Chi-Square test and the log-likelihood ratio test, the null hypothesis must be rejected in each case, using both tests. The effect size (Cramér's  $V = 0.62$ ) indicates a large practical significance, suggesting a strong relationship between decentralization/information sharing and record management effectiveness. Hence, it is hereby concluded that the decentralization of e-record management and the ability to share information significantly influence the overall effectiveness and efficiency of record management

practices in Katsina State.

Decentralization of school data promotes integrity, confidentiality, and secure data sharing through layered architecture, resulting in more secure, accessible, and streamlined record-management workflows in educational institutions (Kong, 2024). Digitalization (cloud/computer storage) of school records has a significant impact on administrative efficiency. There is a strong positive correlation between the adoption of digital solutions and improvements in record-keeping accuracy, accessibility, safety, and overall school administration efficiency. The summary tables are used to further describe the characteristics related to this research hypothesis. From Table 7, it can be deduced that, on the average, the respondents said that they sometimes use computers daily for work (mean = 2.77, SD = 1.29). Similarly, the respondents said that they rarely use smartphones for work-related tasks (mean = 2.07, SD = 0.96). Again, the respondents also said that they rarely use tablets regularly for work (mean = 2.38), among others. The Likert scale ranges from 1 (Never) to 5 (Always). These low usage rates are consistent with the limited device availability

**Table 7:** How people make use of electronic record keepings.

Individual Usage	Mean	SD	Remark
I use computers daily for work	2.77	1.29	Sometimes
I use smartphones for work-related tasks	2.07	0.96	Rarely
I use tablets regularly for work	2.38	1.05	Rarely
I use digital storage (cloud/drives)	2.68	1.14	Sometimes
I use electronic Management Information System (EMIS)	2.46	1.19	Rarely

**Table 8:** Perceived usefulness of electronic record keepings.

Usefulness	Mean	SD	Remark
Electronic record keeping would make my job easier	4.35	0.88	Agreed
Electronic systems would improve record accuracy	4.39	0.84	Agreed
Digital records would save time	4.45	0.80	Agreed
Electronic systems would reduce errors	4.41	0.82	Agreed
Digital records would improve information sharing and decentralization	4.38	0.87	Agreed

**Table 9:** Perceived Ease of Use of electronic record keepings.

Usage	Mean	SD	Remark
Learning to use electronic record system would be easy	4.32	0.78	Agreed
Digital records are easy to organize	4.33	0.80	Agreed
Electronic searching is straightforward	4.35	0.77	Agreed
Digital updating is simple	4.34	0.74	Agreed
Electronic sharing is convenient	4.27	0.80	Agreed

**Table 10:** Perceived Acceptability of electronic record keepings.

Acceptability	Mean	SD	Remark
Electronic records would enhance efficiency	4.38	0.73	Agreed
Electronic records would improve work quality	4.44	0.70	Agreed
Digital systems would increase productivity	4.40	0.68	Agreed
Digital systems would improve reporting	4.38	0.75	Agreed
Electronic records would reduce workload	4.40	0.72	Agreed

reported in (Table 7). From Table 8, it can be deduced that, on the average, the respondents agreed that electronic record keeping would make their job easier (mean = 4.35, SD = 0.88). Similarly, the respondents also agreed that electronic systems would improve record accuracy (mean = 4.39, SD = 0.84). Again, the respondents agreed that digital records would save time (mean = 4.45), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). These high ratings reflect positive attitudes toward potential ERKS benefits, based on training exposure and limited experience with electronic systems. From Table 9, it can be deduced that, on the average, the respondents agreed that learning to use electronic record system would be easy (mean = 4.32, SD = 0.78). Similarly, the respondents also agreed that digital records are easy to organize (mean = 4.33, SD = 0.80). Again, the respondents agreed that electronic searching is straightforward (mean = 4.35), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). These perceptions are based on limited hands-on experience and training demonstrations, rather than

sustained use under current infrastructure constraints. From Table 10, it can be deduced that, on the average, the respondents agreed that electronic records would enhance efficiency (mean = 4.38, SD = 0.73). Similarly, the respondents also agreed that electronic records would improve work quality (mean = 4.44, SD = 0.70). Again, the respondents agreed that digital systems would increase productivity (mean = 4.40), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). From Table 11, it can be deduced that, on the average, the respondents agreed that learning electronic systems requires minimal effort (mean = 4.17, SD = 0.78). Similarly, the respondents also agreed that using digital records is clear and understandable (mean = 4.39, SD = 0.67). Again, the respondents agreed that electronic systems are easy to master (mean = 4.21), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). From Table 12, it can be deduced that, on the average, the respondents agreed that school leaderships support electronic record keeping (mean = 4.27, SD = 0.76). Similarly, the respondents also agreed that staff

**Table 11:** Effort Expectancy of electronic record keepings.

Challenges	Mean	SD	Remark
Learning electronic systems requires minimal effort	4.17	0.78	Agreed
Using digital records is clear and understandable	4.39	0.67	Agreed
Electronic systems are easy to master	4.21	0.80	Agreed
Digital record-keeping is straightforward	4.33	0.73	Agreed
Electronic systems are user-friendly	4.32	0.71	Agreed

**Table 12:** Social Influence of electronic record keepings.

Influence	Mean	SD	Remark
School leadership supports electronic record keeping	4.27	0.76	Agreed
My colleagues think we should use electronic records	4.24	0.74	Agreed
The ministry promotes digital record-keeping	4.12	0.85	Agreed
Other schools are successfully using electronic records	4.01	0.93	Agreed
Professional networks recommend electronic systems	4.17	0.79	Agreed

**Table 13:** Facilitating conditions of electronic record keepings.

Conditions	Mean	SD	Remark
I have the resources necessary to use electronic records	3.43	1.19	Neutral
I have the knowledge necessary to use electronic systems	4.04	0.84	Agreed
Technical support is available for assistance	3.93	0.85	Agreed
Training is accessible	4.08	0.81	Agreed

**Table 14:** Urgency of electronic record keepings.

Urgency	Mean	SD	Remark
The need to transition from manual to electronic record-keeping practices is urgent	4.28	0.70	Agreed
The inefficiencies in manual record-keeping methods (e.g. Errors, delays) justify the need for change	4.23	0.70	Agreed
Traditional methods are insufficient	4.07	0.85	Agreed
Change would benefit everyone	4.34	0.71	Agreed
Digital transformation is urgent	4.29	0.73	Agreed

**Table 15:** Guiding Coalition for electronic record keepings.

Coalition	Mean	SD	Remark
A dedicated team is in place to lead the implementation of electronic record-keeping practices	4.24	0.74	Agreed
Key stakeholders (e.g. Leadership, IT, and administrative staff) are actively involved in the transition	4.17	0.71	Agreed
Leadership is committed to providing the necessary resources for this initiative	4.18	0.74	Agreed

members support the use of electronic records (mean = 4.24, SD = 0.74). Again, the respondents agreed that the ministry promotes digital record-keeping (mean = 4.12), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). From Table 13, it can be deduced that, on the average, the respondents were neutral on whether they have the resources necessary to use electronic records (mean = 3.43, SD = 1.19). This neutral rating aligns with the infrastructure deficits shown in Tables 4 and 5. Similarly, the respondents agreed that they have the knowledge necessary to use electronic systems (mean = 4.04, SD = 0.84). Again, the respondents agreed that technical support is available for assistance (mean = 4.08), among others. The Likert scale ranges from

1 (Strongly Disagree) to 5 (Strongly Agree). From Table 14, it can be deduced that, on the average, the respondents agreed that the need to transition from manual to electronic record-keeping practices is urgent (mean = 4.28, SD = 0.70). Similarly, the respondents also agreed that the inefficiencies in manual record-keeping methods (e.g., errors, delays) justify the need for change (mean = 4.23, SD = 0.70). Again, the respondents agreed that the traditional methods are insufficient (mean = 4.07), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). From Table 15, it can be deduced that, on the average, the respondents agreed that a dedicated team is in place to lead the implementation of electronic record-keeping practices (mean = 4.24, SD =

0.74). Similarly, the respondents also agreed that key stakeholders (e.g., Leadership, IT, and administrative staff) are actively involved in the transition (mean = 4.17, SD = 0.71). Again, the respondents agreed that the leadership is committed to providing the necessary resources for this initiative (mean = 4.18), among others. The Likert scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree).

### Qualitative Findings

The qualitative data were collected through in-depth interviews with 19 stakeholders representing diverse roles (administrators, IT personnel, teachers from urban and rural schools, and ministry officials). Data saturation was achieved after 17 interviews, with two additional interviews conducted for confirmation. The qualitative data were analyzed under three main themes: decentralization and local control, value of electronic records, and implementation challenges.

#### Theme 1: Decentralized Control and Local Responsiveness

Interviews confirmed that schools currently operate under centralized control from education authorities. Respondents reported slow approval processes for resources as one of the challenges of the central system. Several interviewees felt that greater autonomy over record systems would expedite updates and backups. For example, Respondent 1 (Urban Administrator) noted: "If each school manages its own data backup schedule, they will react more quickly to needs." This qualitative insight resonates with decentralization theory which posits that shifting authority to local units should improve service efficiency and participation. Respondent 4 (State Ministry Official) explained the current centralized approval process: "The top-level administration really wants to go digital in the entire data ecosystem. In the manual data chain, the honourable Commissioner gives the overall approval through the Department of Planning, Research and Statistics before data is released, especially for research purposes across institutions and by individual students. But down the level there are certain numbers or types of data that are accessible through some control. For example, the Director of Planning, Research and Statistics has the mandate of releasing the number of students, number of teachers, number of classrooms based on demands down to the LEA level. They have access to their information. So, an education secretary in LEA or a zonal coordinator in the case of a zone can give you information about their zone, but they must give you published information that is already in the public domain."

#### Theme 2: Value of Electronic Records

Administrators expressed positive attitudes toward e-record systems. They highlighted benefits such as real-

time data sharing among staff and reduced paperwork. Respondent 1 (Urban Administrator) stated: "With electronic system, there will be coordination, synergy and communication between the systems in place. At one point the school can communicate to the LGA easily and can communicate to the State easily via the record keeping platforms and the LGA one can quickly communicate to the system. So, there will be no biases in the system. There will be proper utilization of the system so there will be efficiency and effectiveness of the duty or management of the staff data and what have you in the education system." These perceptions match our survey findings and the literature that e-systems enhance efficiency and information flow. Respondent 7 (IT Personnel, Urban School) added: "Electronic records eliminate the problem of lost files and make it much easier to generate reports quickly when needed by authorities."

#### Theme 3: Challenges in Implementation

Despite acknowledging benefits, participants emphasized obstacles. Several interviewees mentioned the absence of a guiding policy: without a clear framework, each school improvises its system. This reflects Muhammad et al.'s (2021) observation that records and information are being handled disproportionately in the absence of standard management policies. Technical constraints were also stressed: unreliable internet and a lack of IT support staff were common complaints. Respondents 1, 2, and 3 (representing both urban and rural schools) said: "The administration has identified the technical skills of the staff and then infrastructure challenges e.g., unstable internet connectivity and then the power in rural or remote schools." Respondent 11 (Rural Teacher) emphasized: "Even when we receive training on electronic systems, without reliable electricity and internet at our school, we cannot apply what we learned. We end up falling back to manual methods." These practical challenges reinforce the need for investments in infrastructure and capacity building, as other studies have recommended. Respondent 15 (LGA Education Officer) suggested: "A phased approach starting with well-equipped urban schools while simultaneously investing in rural infrastructure would be more realistic than attempting system-wide implementation immediately." Collectively, the results (quantitative trends and qualitative themes) indicate that decentralized electronic record systems can substantially improve record management outcomes. The key themes across both data types guide the further discussion: improved efficiency and timely access to records, enhanced security and data integrity, organizational gaps (policy, training) that limit effectiveness, and infrastructure needs (hardware, power, connectivity) as critical constraints.

### DISCUSSION

This study investigated the utility of decentralizing

electronic record systems in Nigerian schools to improve record management practices, with particular focus on Katsina State. The findings reveal a complex landscape where positive attitudes toward ERKS coexist with significant infrastructure and policy challenges. The statistical analysis confirmed that decentralization of e-record management and enhanced information sharing significantly influence record management effectiveness ( $p < 0.001$ , Cramér's  $V = 0.62$ ). This large effect size suggests that when infrastructure and policy prerequisites are met, decentralized systems can substantially improve school record management. These findings align with decentralization theory (Rondinelli et al., 1983), which posits that transferring authority to local levels enhances service delivery and responsiveness. The qualitative data further supported this, with stakeholders emphasizing how local control over backup schedules and system access could improve operational efficiency.

However, a critical finding from this study is the stark contrast between positive perceptions of ERKS and the current infrastructure reality. While respondents strongly agreed that electronic systems would be easy to use and would improve efficiency (means ranging from 4.17 to 4.45), the data also revealed that 82% of schools lack reliable electricity, 82% lack internet connectivity, and 86% lack access to computers (Tables 4 and 5). This discrepancy can be explained by the fact that respondents' positive perceptions are based primarily on training demonstrations and limited exposure to electronic systems in better-equipped settings, rather than sustained use under current infrastructure constraints. As qualitative data revealed, even trained staff cannot implement electronic systems when basic infrastructure is absent. These findings resonate with studies from other African contexts. Similar to Kenya's experience (Mutula & Wamukoya, 2009), where government-led e-record initiatives have shown promise but face rural-urban disparities, Katsina State exhibits significant infrastructure inequalities between urban and rural schools. South African universities' progress (Kashaija, 2022; Ngoepe & Mojapelo, 2024) demonstrates what is possible with adequate technological infrastructure, but the present study highlights that primary and secondary schools in resource-constrained settings face fundamentally different challenges than well-funded universities.

The Technology Acceptance Model (Davis, 1989) constructs were validated in this context. Respondents demonstrated high perceived usefulness (mean = 4.35-4.45) and perceived ease of use (mean = 4.32-4.35) of ERKS. However, the UTAUT2 construct of facilitating conditions revealed a critical gap: respondents were only neutral (mean = 3.43) about having necessary resources, consistent with the infrastructure deficits documented in the study. This suggests that while psychological readiness for technology adoption is high, material conditions remain the primary barrier. The qualitative findings highlighted three implementation priorities. First, the absence of standardized policies creates inconsistent

practices across schools, echoing Muhammad et al.'s (2021) observations about Nigerian public universities. Second, technical capacity building must accompany infrastructure development. Third, a phased implementation approach starting with better-equipped schools while investing in rural infrastructure was recommended by stakeholders as more feasible than immediate system-wide deployment.

### Limitations

Several limitations should be noted. First, this study employed a cross-sectional design, capturing perceptions at a single point in time. Longitudinal research would better illuminate the actual implementation process and outcomes over time. Second, the study focused on Katsina State; findings may not be fully generalizable to other Nigerian states with different infrastructure levels and administrative contexts. Third, while qualitative data provided rich insights, the sample of 19 interviewees, though sufficient for saturation, represents a limited range of perspectives. Fourth, respondents' positive perceptions of ERKS may be aspirational rather than based on extensive hands-on experience, given current infrastructure constraints.

### Conclusions and Recommendations

This study concludes that while decentralization of electronic record systems holds significant promise for improving school record management in Katsina State, Nigeria, successful implementation is contingent upon addressing fundamental infrastructure deficits and establishing clear policy frameworks. The statistical evidence demonstrates a strong positive relationship between decentralization/information sharing and record management effectiveness. However, realizing these benefits requires systematic investment in electricity, internet connectivity, computing devices, and technical capacity. Furthermore, Decentralized ERKS allows for controlled, real-time updates, reducing duplication of records and inconsistencies that commonly occur in manual systems. This has implications for improving data integrity and minimizing administrative errors, which can have serious consequences for both statutory and non-statutory records, and compliance with regulatory standards. **Recommendations for Practice:** Schools should use electronic record systems and make their own rules for how to use them on top of the national policy. Administrators and record officers need to get regular training to keep these systems running smoothly. Tech support (like IT staff) should be available at the school level to make sure that operations continue. Schools could also try out decentralized solutions (like local servers or cloud platforms) to see if they can improve collaboration and efficiency. **Recommendations for Policy:** The Ministry of Education (or the right authority) should make a National Records Management Policy for schools that sets rules for

electronic records, how long they should be kept, and how data should be managed. This policy should clearly support the decentralization of e-record systems by giving schools control over their own recordkeeping resources. This is in line with the goals of decentralization to give local governments more power. Schools should allocate adequate resources to buy computers and smart devices, backup power, and safe networks. Recommendations for Future Research: Future studies should evaluate the lasting impacts of decentralized record systems in educational institutions. Pilot programs employing blockchain or alternative decentralized technologies should be assessed for viability and results. Comparative research across diverse regions or school types would clarify generalisability. Ultimately, ethnographic research on educators' adaptation to decentralized workflows would deepen the understanding of human factors in technology adoption. Based on the recommendations, the following phased implementation(s) are proposed:

### Phase 1: Policy and Infrastructure Foundation (Years 1)

The Ministry of Education and State Universal Basic Education Board should develop comprehensive data management policies addressing security, privacy (aligned with Nigeria's Data Protection Regulation), access protocols, and standardized procedures. Simultaneously, prioritize infrastructure investment in electricity (solar solutions where grid power is unreliable) and internet connectivity (exploring partnerships with telecommunications providers for educational institutions). Begin with pilot implementation in 10-15 well-equipped schools to test systems and identify best practices.

### Phase 2: Capacity Building and Expanded Implementation (Years 2-3)

Based on pilot lessons learned, expand implementation to additional schools with adequate infrastructure while conducting intensive training programs for administrators, teachers, and IT staff. Establish regional support centers to provide ongoing technical assistance. Develop a decentralized system architecture that allows local schools autonomy over routine operations (data entry, backups, user management) while maintaining state-level oversight for security and standardization.

### Phase 3: System-Wide Deployment and Sustainability (Years 5+)

Progressively extend ERKS to all schools as infrastructure reaches adequate levels. Establish sustainable funding mechanisms for system maintenance, upgrades, and continued training. Implement regular evaluation and feedback mechanisms to ensure system effectiveness and address emerging challenges. This phased approach acknowledges current constraints

while providing a realistic pathway toward comprehensive ERKS implementation. Future research should conduct longitudinal studies tracking actual implementation outcomes, compare experiences across different Nigerian states, and investigate cost-effective infrastructure solutions suitable for resource-constrained settings.

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