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Data-Informed Decision Making: How School Administrators Use Analytics for Resource Allocation and Policy

Onyeukwu, Veronica Ezinne, PhD.

ezimeche22@gmail.com,

National Teachers' Institute, Kaduna, Nigeria.

Ruth Asemota, PhD.

ruth.asekota@uniabuja.edu.ng

Centre for Distance Learning and Continuing Education

University of Abuja, Nigeria

Edinoh Kingsley, PhD.

edinohkings@gmail.com

National Examinations Council (NECO) Headquarter, Minna, Niger State, Nigeria

Article information:

Manuscript received: 4 Apr 2026; **Accepted:** 05 May 2026; **Published:** 27 Jun 2026

Abstract: The growing availability of educational data and digital technologies has transformed the way school administrators plan, manage, and evaluate educational activities. In contemporary school systems, data-informed decision making (DIDM) has become an essential leadership approach that enables administrators to utilise evidence from student performance records, attendance data, financial reports, enrolment statistics, and learning analytics to improve educational outcomes and institutional effectiveness. This study investigated the utilisation of analytics by school administrators for resource allocation and policy development in secondary schools. Specifically, the study examined the extent to which administrators use data in decision-making processes, the influence of analytics on administrative efficiency, and the challenges associated with implementing data-informed leadership practices. A descriptive survey research design was adopted for the study. The population consisted of principals, vice principals, education officers, teachers, and ICT coordinators drawn from selected secondary schools in South – East Nigeria. Using a stratified random sampling technique, a sample of 510 respondents was selected. Data were collected through the Data-Informed School Leadership Questionnaire (DISLQ) and analysed using mean scores, standard deviation, Pearson Product Moment Correlation, and t-tests. The findings revealed that school administrators increasingly rely on educational data and digital dashboards to support strategic planning, policy formulation, instructional supervision, and resource allocation. The study further established that data-informed decision making significantly enhances administrative efficiency, accountability, transparency, and effective utilisation of available resources. However, major constraints identified included inadequate ICT infrastructure, poor data literacy, limited funding, data quality concerns, insufficient professional training, and resistance to technological change. The study concluded that effective data-informed leadership strengthens educational planning and school performance when supported by robust technological infrastructure, continuous capacity building, and sound data governance practices. Recommendations included sustained professional development, improved digital infrastructure, strengthened education management information systems, and policies that promote evidence-based educational leadership.

Keywords: Data-Informed Decision Making, School Leadership, Educational Analytics, Resource Allocation, Educational Policy, Learning Analytics, Educational Management, School Administration.

Introduction

In today's educational landscape, technology has become a central component of teaching and learning, shaping how knowledge is accessed, shared, and applied. From digital simulations and interactive learning platforms to collaborative online tools, technology offers unprecedented opportunities to enhance student engagement, personalise instruction, and prepare learners for the demands of a digital society Edinoh, Odili & Wakili [1]. The rapid advancement of digital technologies and educational information systems has fundamentally transformed administrative decision-making processes within contemporary schools. Educational institutions increasingly generate vast amounts of data relating to student achievement, attendance, teacher performance, financial management, enrolment patterns, behavioural records, and institutional operations. Consequently, school administrators are increasingly expected to utilise data analytics and evidence-based strategies to guide resource allocation, policy formulation, instructional improvement, and institutional planning.

Data-informed decision making (DIDM) refers to the systematic collection, analysis, interpretation, and application of educational data to support effective administrative and instructional decisions. Unlike intuition-based leadership approaches, DIDM emphasises the use of empirical evidence to improve organisational effectiveness, accountability, transparency, and educational outcomes [2], [3].

Contemporary educational systems increasingly rely on educational management information systems (EMIS), learning analytic platforms, predictive analytics, digital dashboards, and data visualisation tools to guide institutional decision-making. School administrators now use real-time data to monitor student achievement, identify at-risk learners, allocate resources efficiently, evaluate instructional programmes, and design school improvement strategies.

Recent scholarship suggests that data-informed leadership enhances strategic planning, organisational efficiency, and student performance when properly implemented. Educational analytics enables administrators to identify trends, predict institutional challenges, evaluate programme effectiveness, and make timely evidence-based interventions. Data-driven systems further support transparency and accountability within educational governance [4].

Within resource allocation processes, educational analytics assists administrators in determining staffing needs, budgeting priorities, infrastructure development, instructional material distribution, and intervention programmes. School leaders increasingly utilise enrolment statistics, attendance patterns, examination results, and demographic data to allocate limited educational resources more effectively.

Similarly, data-informed policy development enables administrators to design targeted interventions responding to institutional needs. Policies regarding curriculum implementation, teacher professional development, student discipline, assessment practices, and school improvement increasingly rely on data analysis and evidence-based planning.

The growing adoption of artificial intelligence, educational data mining, and predictive analytics further expands the possibilities of data-informed educational leadership. Advanced analytic systems can identify patterns in student learning, predict dropout risks, monitor teacher effectiveness, and support institutional forecasting, Edinoh, Abiola & Nwafor (2024).

Despite these opportunities, several challenges continue to affect effective implementation of data-informed decision making within schools [5]. Many administrators lack adequate data literacy, technological competence, and analytical skills

required for interpreting educational data effectively. In many developing educational systems, infrastructural deficiencies, poor internet connectivity, inadequate funding, and limited ICT facilities further constrain effective data use, Asemota, Edinoh & Bisong.

Concerns regarding data quality, privacy, ethical governance, and overdependence on quantitative metrics additionally affect educational data practices. Poor-quality data may produce inaccurate conclusions and ineffective policy decisions. Scholars therefore emphasise the importance of ethical data governance, contextual interpretation, and balanced leadership approaches.

Within Nigerian schools and other developing educational systems, data-informed leadership remains relatively underdeveloped despite increasing emphasis on educational accountability and digital governance [6]. Many schools continue to rely on manual administrative processes and fragmented data systems, thereby limiting effective evidence-based planning.

This study therefore investigates how school administrators utilise analytics for resource allocation and policy development within secondary schools.

Statement of the Problem

Educational institutions increasingly generate large volumes of administrative and instructional data. However, many school administrators continue to experience difficulties effectively utilising such data for policy formulation, resource allocation, and institutional planning.

In many schools, administrative decisions regarding budgeting, staffing, instructional materials, and school improvement initiatives are still influenced by intuition, political considerations, or incomplete information rather than systematic evidence-based analysis. Consequently, inefficiencies in resource utilisation and policy implementation frequently occur [7].

Furthermore, many educational administrators possess limited data literacy and insufficient training in educational analytics, data interpretation, and evidence-based leadership practices. Infrastructural limitations including inadequate ICT facilities, unstable internet connectivity, poor funding, and fragmented data systems additionally constrain effective implementation of data-informed decision making.

Concerns regarding data quality, privacy, technological dependence, and ethical governance further complicate educational data practices. Despite growing interest in educational analytics globally, limited empirical studies have specifically examined how school administrators utilise analytics for resource allocation and policy development within secondary school contexts [8].

This study therefore seeks to address this gap.

Objectives of the Study

The study sought to:

1. Examine the extent to which school administrators utilise analytics in decision making.
2. Determine the influence of data-informed decision making on resource allocation and policy development.
3. Investigate the relationship between educational analytics and administrative effectiveness.
4. Identify challenges affecting data-informed leadership within schools.
5. Suggest strategies for improving evidence-based educational administration.

Research Questions

1. To what extent do school administrators utilise analytics in decision making?
2. How does data-informed decision-making influence resource allocation and policy development?

3. What relationship exists between educational analytics and administrative effectiveness?
4. What challenges affect data-informed leadership within schools?

Hypotheses

H₀₁: There is no significant relationship between educational analytics and administrative effectiveness.

H₀₂: Data-informed decision making does not significantly improve resource allocation efficiency in schools.

Theoretical Framework

This study is anchored on Systems Theory, Evidence-Based Management Theory, and Transformational Leadership Theory. These theories provide a comprehensive framework for understanding how school administrators utilise data and analytics to improve decision-making, allocate resources effectively, and formulate policies that enhance educational outcomes. Collectively, the theories explain the interconnected nature of school operations, the importance of evidence-driven management practices, and the leadership competencies required to translate data into meaningful institutional improvements.

Systems Theory

Systems Theory, developed by Ludwig Von Bertalanffy, views organisations as interconnected systems whose various components function in continuous interaction with one another. According to the theory, changes in one part of a system inevitably influence other parts, making coordination and information flows essential for organisational effectiveness [9]. Within the educational context, schools operate as complex systems comprising administrators, teachers, students, support staff, parents, infrastructure, financial resources, and policy frameworks. Decisions regarding staffing, budgeting, curriculum implementation, student welfare, and resource allocation often have far-reaching implications across the entire institution.

The relevance of Systems Theory to this study lies in its explanation of how data-informed decision making enables administrators to understand relationships among various institutional variables and make coordinated decisions that support overall school effectiveness. Through the analysis of educational data, school leaders can identify patterns, predict outcomes, and implement interventions that address multiple institutional needs simultaneously. The theory therefore provides a useful lens for examining how analytics support integrated and strategic educational management.

Evidence-Based Management Theory

Evidence-Based Management Theory emphasises the systematic use of empirical evidence, organisational data, professional expertise, and research findings in managerial decision-making. The theory emerged from the recognition that effective organisational decisions should be guided by verifiable evidence rather than intuition, assumptions, or personal preferences. It advocates the collection, analysis, and application of relevant information to improve planning, problem-solving, accountability, and organisational performance [10].

In educational administration, Evidence-Based Management Theory underscores the importance of utilising student achievement data, attendance records, financial reports, enrolment statistics, and other institutional indicators to guide policy formulation and strategic planning. School administrators increasingly rely on educational analytics and management information systems to assess performance, identify areas requiring improvement, and allocate resources more efficiently. The theory is particularly relevant to this study because it directly explains the rationale behind data-informed decision making and provides a conceptual foundation for understanding how evidence-based practices contribute to improved administrative effectiveness and educational outcomes.

Transformational Leadership Theory

Transformational Leadership Theory, developed by James MacGregor Burns and later expanded by Bernard M. Bass, emphasises visionary leadership, innovation, organisational change, and the ability of leaders to inspire followers toward the achievement of shared goals. The theory suggests that effective leaders motivate stakeholders, encourage continuous improvement, and create environments that foster growth and innovation.

Within the context of educational leadership, transformational leaders utilise data and evidence to identify institutional challenges, establish clear improvement goals, and implement strategic reforms that enhance teaching, learning, and administrative performance [11]. Data-informed leadership enables school administrators to monitor progress, evaluate interventions, and make informed adjustments that support sustainable school improvement. The theory is relevant to this study because it highlights the leadership capacity required to transform analytical insights into practical actions and policies that promote institutional effectiveness and improved student outcomes.

Taken together, Systems Theory, Evidence-Based Management Theory, and Transformational Leadership Theory provide a robust theoretical foundation for examining the utilisation of analytics in educational administration. While Systems Theory explains the interconnected nature of school operations, Evidence-Based Management Theory emphasises the value of data in decision-making, and Transformational Leadership Theory highlights the leadership processes through which data-driven insights are translated into meaningful educational improvements. These perspectives collectively strengthen the understanding of data-informed decision making as a critical tool for effective school leadership, resource allocation, and policy development.

Literature Review

Recent scholarship has increasingly drawn attention to the expanding role of educational analytics and data-informed leadership in contemporary school administration. Across different educational systems, there is growing consensus that schools are no longer relying solely on intuition or experience in decision-making; instead, they are progressively embracing structured data systems to strengthen accountability, improve transparency, and enhance institutional effectiveness Ogunode, Edinoh & Awah [12].

Evidence from prior studies shows that school administrators now draw on a wide range of data sources to guide decision-making processes. These include student academic performance records, attendance trends, behavioural reports, budgetary and financial information, teacher evaluation data, and enrolment statistics. Increasingly, these data sources are integrated into educational dashboards and visualisation tools that allow administrators to interpret complex information in simplified formats, thereby supporting faster and more informed decisions.

For example, Alonzo et al, Asemota, Edinoh & Attah found that ICT-based data systems significantly improve both teaching and administrative decision-making, particularly in institutions with adequate technological infrastructure and staff training. In a related study, Lee et al. reported that school leaders increasingly rely on benchmark assessments and learning analytics to guide instructional planning, curriculum adjustments, and school improvement strategies. Their findings suggest that when data is effectively utilised, it becomes a powerful tool for improving both classroom instruction and institutional governance [13].

Further studies consistently show that data-informed leadership enhances resource allocation efficiency, strengthens policy implementation, and improves student performance outcomes. Through educational data mining and predictive analytics, administrators are now able to identify emerging trends, forecast enrolment patterns, and

allocate resources more strategically. This shift reflects a move from reactive to proactive school management.

In addition, the literature highlights that educational analytics improves accountability and transparency. When data systems are effectively implemented, school leaders are able to monitor teacher performance, programme effectiveness, and student outcomes more systematically, thereby reducing inefficiencies and improving governance.

However, scholars also emphasise that the effectiveness of data-informed decision making depends heavily on the data literacy skills of educational leaders. Many administrators still struggle to interpret complex datasets and translate them into meaningful policy actions [14]. In many developing contexts, infrastructural limitations such as poor internet connectivity, inadequate ICT facilities, insufficient funding, and fragmented data systems continue to constrain the effective use of educational analytics.

Within the Nigerian context, Adenubi and Oyenuga argued that real-time Education Management Information Systems (EMIS) could significantly improve administrative efficiency and policy development if supported by adequate infrastructure and capacity building. Their study highlights the urgent need for stronger digital systems to support evidence-based school leadership [15].

At the same time, emerging literature raises ethical concerns surrounding data governance in education. Issues such as data privacy, surveillance, security, and the overreliance on quantitative indicators are increasingly being discussed Igwe, Oche & Edinoh. Scholars caution that excessive dependence on numerical data may oversimplify educational realities and ignore important contextual and socio-cultural factors influencing learning.

Edinoh, Onah & Oluwole also posits that recent advances in artificial intelligence and educational data mining are further expanding the possibilities of predictive analytics in education. These technologies are increasingly used for dropout prediction, resource optimisation, and strategic planning, thereby reinforcing the importance of data-driven leadership in modern education systems. Overall, the literature suggests that while educational analytics offers significant benefits, its effectiveness depends on leadership capacity, infrastructure, and ethical governance [16].

Methodology

Research Design

The study adopted a descriptive survey research design, which is appropriate for collecting standardised information from a large population and describing existing conditions without manipulating variables.

Population of the Study

The population comprised principals, vice principals, teachers, ICT coordinators, and education officers drawn from selected secondary schools. These groups were considered relevant because they are directly involved in school administration, instructional supervision, and ICT-based decision-making.

Sample and Sampling Technique

A total sample of 510 respondents was selected using stratified random sampling to ensure fair representation across different administrative and professional categories.

Respondent Category	Frequency
Principals	60
Vice Principals	80

Teachers	300
ICT Coordinators	30
Education Officers	40
Total	510

The distribution shows that teachers formed the largest proportion of respondents, reflecting their central role in data generation (student assessment, attendance, and classroom performance records), while administrators and ICT coordinators provided insights into decision-making and system usage.

Instrumentation

Data were collected using three structured instruments:

1. Data-Informed School Leadership Questionnaire (DISLQ)
2. Educational Analytics Perception Scale
3. Administrative Effectiveness Inventory

The instruments demonstrated high internal consistency, with a Cronbach Alpha reliability coefficient of 0.90, indicating strong reliability and suitability for the study.

Method of Data Analysis

Data were analysed using descriptive and inferential statistics, including mean scores, standard deviation, Pearson Product Moment Correlation, and independent t-test. A decision benchmark of 2.50 was used, where mean scores of 2.50 and above indicated agreement.

Results and Interpretation

This section presents the results of the study on the use of educational analytics in school administration, focusing on descriptive and inferential statistical analyses of the collected data. The findings are organised in line with the research questions and hypotheses to provide clear evidence on the extent, influence, and challenges of data-informed decision making in secondary schools.

Table 1: Extent of Analytics Use Among School Administrators

Variable	Mean	SD	Decision
Use of student performance data	3.91	0.68	Agree
Use of attendance analytics	3.85	0.70	Agree
Use of budget and financial data	3.88	0.69	Agree
Use of enrolment statistics	3.82	0.73	Agree
Use of digital dashboards for planning	3.79	0.74	Agree

Table 1: Interpretation.

The results show high mean scores across all indicators, ranging from 3.79 to 3.91, which are well above the 2.50 benchmark. This indicates a strong agreement among respondents that school administrators actively use educational data in decision-making. The highest-rated item was the use of student performance data (Mean = 3.91), suggesting

that academic results remain the most influential factor in administrative decisions [17]. Budget and financial data (Mean = 3.88) and attendance analytics (Mean = 3.85) also ranked highly, indicating that administrators rely not only on academic data but also on operational and financial indicators. Digital dashboards recorded the lowest mean (3.79), although still within the ‘agree’ range. This suggests that while digital tools are being used, their adoption may not yet be fully maximised across all schools.

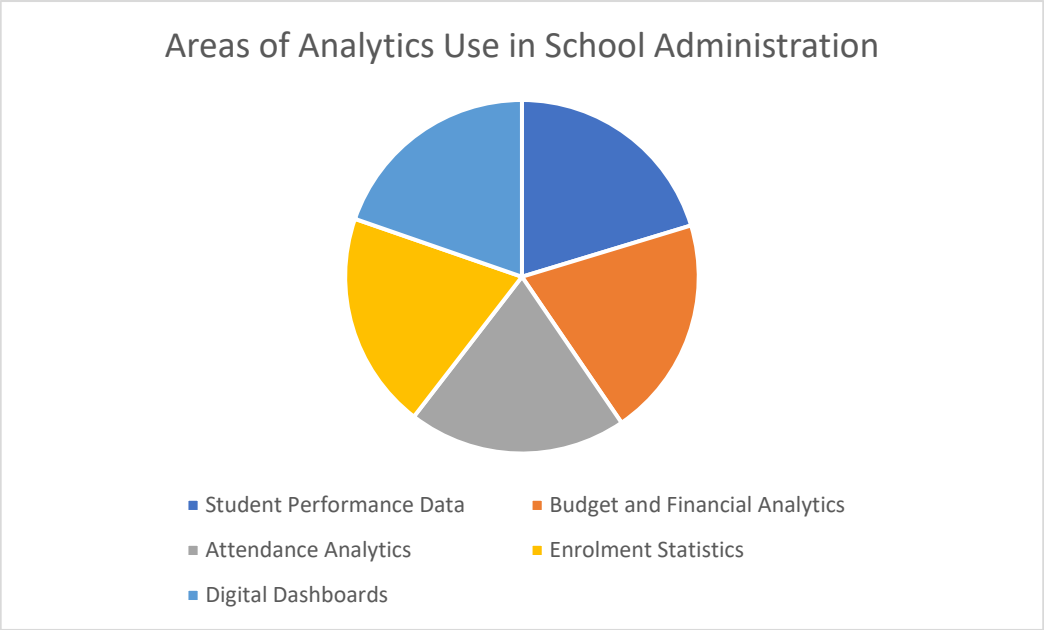


Chart 1: Areas of Analytics Use in School Administration

Interpretation of Chart 1:

The chart visually reinforces Table 1 by showing that student performance data dominates administrative analytics usage, followed closely by budgetary and attendance data. Enrolment statistics and digital dashboards appear slightly lower, suggesting areas where schools may still be developing capacity. Overall, the pattern indicates growing but uneven integration of digital analytics tools in school administration [18], [19]. The findings indicate that school administrators extensively utilise educational analytics in administrative planning and institutional management.

Table 2: Influence of Data-Informed Decision Making on Resource Allocation and Policy

Variable	Mean	Decision
Data improves resource allocation efficiency	3.94	Agree
Analytics supports strategic planning	3.92	Agree
Data improves policy implementation	3.87	Agree
Educational analytics enhances accountability	3.90	Agree
Data-informed leadership improves school effectiveness	3.95	Agree

Table 2: Interpretation.

All mean values range from 3.87 to 3.95, indicating strong agreement that data-informed decision making improves administrative functions. The highest-rated item, ‘data-informed leadership improves school effectiveness’ (Mean = 3.95), suggests that respondents perceive a direct link between analytics use and overall institutional performance. Similarly, high scores for resource allocation efficiency (Mean = 3.94) and

strategic planning (Mean = 3.92) indicate that data is particularly valued in planning and resource management [20]. These findings suggest that data is not merely collected but is actively shaping core administrative decisions, particularly in budgeting, planning, and policy implementation. This reflects a shift toward more evidence-driven school leadership. The findings reveal that data-informed leadership significantly improves resource allocation, policy development, and institutional accountability.

Table 3: Relationship Between Educational Analytics and Administrative Effectiveness

Variable	r	p-value	Decision
Educational Analytics & Administrative Effectiveness	0.84	0.001	Significant

Table 3: Interpretation:

The correlation coefficient ($r = 0.84$, $p = 0.001$) indicates a very strong and statistically significant positive relationship between educational analytics and administrative effectiveness.

This means that as the use of educational analytics increases, administrative effectiveness also increases significantly. The very low p-value confirms that this relationship is not due to chance. Consequently, the null hypothesis was rejected. This result provides strong empirical support for the argument that data-informed decision making is a critical driver of effective school administration [21]. The findings revealed a strong positive relationship between educational analytics and administrative effectiveness. Therefore, the null hypothesis was rejected.

Table 4: Challenges Affecting Data-Informed Leadership

Challenge	Mean	Decision
Inadequate data literacy among administrators	3.93	Agree
Poor ICT infrastructure	3.90	Agree
Inadequate funding	3.88	Agree
Poor data quality and reliability	3.84	Agree
Resistance to technological change	3.79	Agree

Table 4: Interpretation: dership

All challenges recorded mean values above 3.70, indicating general agreement that these factors significantly hinder effective data use in schools. The most critical challenge identified is inadequate data literacy among administrators (Mean = 3.93), suggesting that even when data is available, many leaders may lack the skills to interpret and apply it effectively. Poor ICT infrastructure (Mean = 3.90) and inadequate funding (Mean = 3.88) were also major constraints. Resistance to technological change recorded the lowest mean (3.79), though still significant, indicating that some stakeholders may be hesitant to fully adopt digital systems [22].

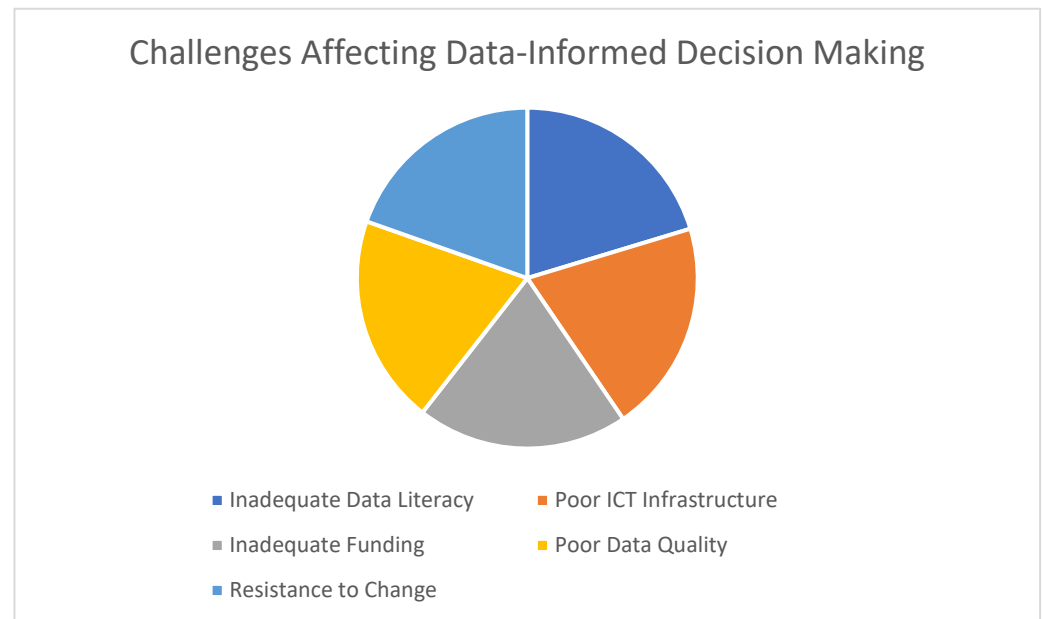


Chart 2: Challenges Affecting Data-Informed Decision Making

Interpretation of Chart 2:

The chart illustrates that data literacy challenges are the most prominent barrier, followed closely by ICT infrastructure limitations. Funding constraints and data quality issues also significantly affect implementation, while resistance to change, though slightly lower, remains a persistent challenge. Overall, the chart highlights that the barriers are both technical and human-capacity related.

Discussion of Findings

The findings revealed that school administrators increasingly utilise educational analytics and institutional data to support administrative decision-making processes. Respondents reported extensive use of student performance data, attendance records, budget analytics, enrolment statistics, and digital dashboards for planning and policy development. These findings align with contemporary scholarship emphasising the growing role of data-informed leadership within educational administration [23], [24], [25].

The study further demonstrated that data-informed decision making significantly improves resource allocation efficiency, strategic planning, accountability, and policy implementation within schools. Administrators reported that educational analytics enables more effective identification of institutional priorities and evidence-based allocation of limited educational resources.

The strong positive relationship identified between educational analytics and administrative effectiveness suggests that evidence-based leadership significantly enhances institutional performance. School leaders who effectively utilise educational data appear more capable of making timely interventions, monitoring organisational performance, and implementing strategic reforms.

The findings additionally revealed that educational analytics improves transparency and accountability within school governance [26]. Administrators using data-informed approaches demonstrated stronger capacity for monitoring instructional programmes, evaluating teacher performance, and assessing institutional outcomes.

However, the study identified major challenges affecting effective implementation of data-informed leadership including inadequate data literacy, poor ICT infrastructure, inadequate funding, poor-quality data, and resistance to technological change. These

findings reflect ongoing challenges affecting digital transformation within many developing educational systems.

Many administrators continue to experience difficulties interpreting complex datasets and translating analytics into meaningful policy decisions. Consequently, professional development and administrative training remain essential for successful implementation of educational analytics [27], [28], [29], [30].

The findings further suggest that infrastructural deficiencies significantly hinder effective educational data practices within resource-constrained school environments. Poor internet connectivity, limited technological facilities, and fragmented education management systems continue to affect evidence-based administration in many schools [31], [32], [33].

Overall, the findings demonstrate that data-informed leadership significantly enhances educational planning, resource management, and institutional effectiveness when supported by appropriate technological infrastructure, professional competence, and ethical governance frameworks [34], [35].

Conclusion

The study concludes that data-informed decision making significantly improves administrative effectiveness, resource allocation efficiency, accountability, and policy implementation within educational institutions. School administrators increasingly utilise educational analytics, digital dashboards, attendance records, financial data, and student performance indicators to support evidence-based leadership practices. However, successful implementation of educational analytics depends on administrators' data literacy, technological competence, infrastructural availability, and institutional support. Effective data-informed leadership therefore requires continuous professional development, ethical data governance, and improved digital infrastructure.

The study further concludes that educational analytics should complement rather than replace contextual judgement, professional experience, and human-centred educational leadership. Balanced integration of evidence-based analytics and professional expertise remains essential for effective school administration.

Recommendations

1. Educational administrators should receive continuous training in data literacy and educational analytics.
2. Governments should improve ICT infrastructure within schools to support digital governance systems.
3. Schools should strengthen education management information systems for real-time data access.
4. Educational institutions should establish ethical policies regulating data privacy and governance.
5. School leaders should combine data analytics with contextual and professional judgement.
6. Governments should provide adequate funding supporting digital transformation in schools.
7. Educational policymakers should encourage evidence-based leadership and accountability practices.

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