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BIG DATA AND ADMINISTRATIVE STAFF DECISION MAKING IN TERTIARY INSTITUTIONS IN RIVERS STATE

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ABSTRACT

In the digital age, Big Data has become a transformative tool in educational administration, particularly in tertiary institutions where data-driven decision-making is crucial to institutional performance. This study investigated the influence of Big Data on administrative staff decision-making in tertiary institutions in Rivers State, Nigeria, with emphasis on student data, faculty staff data, behavioral records, and the moderating role of faculty staff expertise. A correlational survey design was adopted, and data were collected from 316 administrative staff across five tertiary institutions using a structured questionnaire. Data were analyzed using Pearson Product-Moment Correlation and multiple regression techniques. The results revealed a strong and statistically significant relationship between student data and administrative decision-making ($r = 0.642$, $p < 0.05$), as well as between faculty qualifications and decision-making ($r = 0.511$, $p < 0.05$). Student behavioral records were also significantly correlated with the quality of decisions ($r = 0.590$, $p < 0.05$). Furthermore, regression analysis showed that faculty staff expertise significantly moderated the relationship between Big Data and decision-making ($\beta = 0.157$, $p = 0.001$), enhancing the effectiveness of decisions when expertise is present. The study concludes that while Big Data enhances transparency, accuracy, and strategic governance, its impact is greatly amplified when aligned with staff expertise. It is recommended that tertiary institutions invest in digital infrastructure to improve access and management of institutional data, and implement regular training programs to enhance the data literacy and decision-making capabilities of administrative personnel.

KEYWORDS: *Big Data, Administrative Decision-Making, Student Data, Faculty Staff Expertise, Behavioral Records, Digital Infrastructure, Educational Management, Data Literacy.*

INTRODUCTION

In the evolving landscape of higher education, Big Data has emerged as a transformative force in administrative decision-making, particularly within tertiary institutions in Rivers State, Nigeria.

As institutions grapple with increasing student populations, complex resource allocation, and performance accountability, the integration of data-driven strategies has become indispensable for administrative staff seeking to make informed, timely, and impactful decisions (Chux-Nyeche et al., 2022).

Big Data refers to large, complex datasets that traditional data-processing software cannot manage effectively. These datasets are characterized by their volume, velocity, variety, and veracity, and they offer unprecedented insights when properly harnessed (Tantua&Alalibo, 2020). In the context of tertiary education, Big Data encompasses student records, digital learning footprints, administrative logs, and institutional performance metrics. When analyzed, these data streams can reveal patterns that support strategic planning, policy formulation, and operational efficiency (Nweke &Onuekwa, 2021).

In Rivers State, administrative staff in institutions such as Rivers State University and Ignatius Ajuru University of Education are increasingly leveraging digital tools and analytics to enhance decision-making processes. Studies have shown that the use of digital office tools and data analytics significantly correlates with improved administrative effectiveness, including better communication, task execution, and policy implementation (Chux-Nyeche et al., 2022). Moreover, the adoption of digital records and cloud-based systems has improved data accessibility and security, enabling administrators to respond swiftly to institutional challenges (Nweke &Onuekwa, 2021).

However, the integration of Big Data into administrative workflows is not without challenges. Issues such as data privacy, digital literacy gaps among staff, and infrastructural limitations continue to hinder full-scale adoption (Tantua&Alalibo, 2020). Addressing these barriers is crucial for maximizing the potential of Big Data in driving evidence-based decision-making in tertiary institutions across the state.

Ultimately, the human-ware component—the skills, attitudes, and adaptability of administrative personnel—remains central to the success of Big Data initiatives. Without a workforce that is both data-literate and strategically aligned, even the most sophisticated data systems may fall short of delivering meaningful outcomes.

Statement of the Problem

In the rapidly evolving educational landscape of today, tertiary institutions in Rivers State are generating vast amounts of data every day—from student records and academic performance metrics to administrative operations and digital engagement footprints. While the potential of Big Data to transform academic environments is immense, a critical challenge persists: the human capacity to interpret and use this data meaningfully for informed decision-making remains underutilized.

Most decision-making processes within these institutions still rely heavily on intuition, outdated systems, and manual record analysis, leaving a significant gap between the data available and the insights being applied. Institutional leaders and administrators often lack the necessary tools, training, or mindset to harness Big Data in ways that could improve student outcomes, optimize resource allocation, and enhance institutional growth.

This disconnect between technological advancement and human readiness, what we refer to as the humanware gapundermines the value of data-driven governance. Without empowering the

people who interface with the data, even the most sophisticated systems fall short. The problem, therefore, is not just access to data, but the underdevelopment of human capabilities to translate data into actionable strategies that support the mission and sustainability of higher education in Rivers State.

Purpose of the Study

The aim of this study is to investigate the influence of big data on administrative staff decision-making in tertiary institutions in Rivers State, and to examine the moderating role of faculty staff expertise in this relationship.

1. To examine the influence of student data on administrative staff decision-making in tertiary institutions in Rivers State.
2. To assess the influence of faculty staff data (qualifications) on administrative staff decision-making.
3. To determine the relationship between student behavioral records and the quality of administrative decisions.
4. To evaluate the moderating effect of faculty staff expertise on the relationship between big data and administrative staff decision-making.

Research Questions:

1. How does student data influence administrative staff decision-making in tertiary institutions in Rivers State?
2. To what extent does faculty staff data (qualifications) influence administrative decision-making?
3. What is the relationship between student behavioral records and the quality of administrative decisions?
4. How does faculty staff expertise moderate the relationship between big data and administrative staff decision-making?

Hypotheses:

1. There is a significant relationship between student data and administrative staff decision-making.
2. Faculty staff qualifications significantly influence administrative decision-making.
3. Student behavioral records are significantly related to the quality of administrative decisions.
4. Faculty staff expertise significantly moderates the relationship between big data and administrative staff decision-making.

Literature Review

Database and Administrative Decision-Making in Tertiary Institutions

In tertiary institutions across Rivers State, Nigeria, the integration of digital databases has become essential for effective administration. These databases consolidate diverse data sources—student records, faculty profiles, and administrative metrics—into actionable insights that guide institutional decision-making.

Dimensions of Database

Institutional databases are structured around three core dimensions:

Student Data: Academic performance, behavioral records, attendance, and demographics help inform student-focused decisions such as disciplinary actions, counseling support, and academic interventions. Effective record management enhances transparency and responsiveness in administrative processes (Mabera, 2020).

Faculty Staff Data: Qualification details, teaching and research experience, and professional expertise are crucial for curriculum design, task assignment, promotion, and academic planning. Bureaucratic principles such as merit-based evaluation and task specialization are supported by accurate faculty data (Pius-Uwhubetiyi, 2021).

Administrative Staff Data: This dimension tracks responsibilities, performance indicators, and organizational roles, aiding in strategic planning, resource distribution, and institutional accountability. When aligned with technical competence, administrative data supports effective workload allocation and governance (Ajikere& Onyekwere, 2022).

Measures of Administrative Decision-Making

Behavioral Records: Student behavioral trends play a major role in shaping administrative responses to discipline, student engagement, and support services. Proper data management ensures fair and efficient interventions, and reduces litigation risks(Mabera, 2020; Nweke &Onuekwa, 2022).

Staff Qualifications and Expertise: Faculty data enables administrators to assign roles strategically and optimize talent within the institution. Decisions related to recruitment, training, and project leadership are increasingly data-informed, especially when guided by bureaucratic principles (Pius-Uwhubetiyi, 2021; Mmom, 2022).

Theoretical Framework

Record Continuum Theory (Upward, 1990)

This theory presents recordkeeping as a dynamic, integrated process that spans the creation, organization, and application of records. It supports the concept of continuous access and responsible management across time and systems.

Student data such as behavioral records and faculty staff data including qualifications and expertise are not isolated pieces of information—they evolve and accumulate significance over time. Administrative decision-making in tertiary institutions depends heavily on the proper capture, organization, and retrieval of these records. The theory advocates digital records integration to support holistic and timely decisions. Effective recordkeeping directly contributes to institutional performance and enhances administrators' ability to manage data-driven outcomes.

Bureaucratic Theory (Max Weber, 1920)

This theory emphasizes structured hierarchy, rule-bound governance, and technical competence as the foundation of organizational effectiveness.

Decision-making based on qualifications and expertise aligns with the bureaucratic emphasis on meritocracy and specialized roles. The presence of standardized databases allows institutions to

make more rational and consistent decisions regarding academic and behavioral records. In Rivers State tertiary institutions, this structure has been shown to promote effective management (Pius-Uwhubetiyi, 2021).

Administrative Management Theory (Henri Fayol, 1916)

Fayol's theory outlines planning, organizing, commanding, coordinating, and controlling as essential principles for functional administration.

Behavioral records of students and professional expertise of faculty serve as crucial data points for assigning roles, planning interventions, and guiding institutional policies. Centralized database systems support these administrative functions and improve quality delivery. Registry staff, for instance, play a pivotal role in ensuring that decisions are backed by accurate and timely information.

Empirical Review

Several empirical studies have explored factors influencing administrative effectiveness and decision-making processes in tertiary institutions, particularly in the context of data management, digital systems, and staff competencies.

Pius-Uwhubetiyi (2021) investigated the relationship between bureaucratic structures and administrative management in tertiary institutions in Rivers State. The study found a strong correlation between bureaucratic efficiency and effective institutional management, suggesting that administrative processes grounded in structured systems tend to yield more consistent and rational decisions. The role of registry staff in supporting institutional decisions and concluded that registry personnel play a crucial role in maintaining behavioral records and documenting staff qualifications. These records serve as a foundation for accurate and evidence-based administrative decision-making.

However, Nweke and Onuekwa (2021) noted that many tertiary institutions in Rivers State still operate with minimal digital record systems. Their study indicated that the lack of robust digital infrastructure hampers the speed and accuracy of decision-making processes.

Dede (2023) explored the link between communication skills, decision-making competencies, and quality management in universities. The study concluded that administrators who exhibit strong interpersonal and decision-making skills are more likely to lead efficiently, especially when such skills are backed by data accessibility and institutional transparency.

In response to infrastructural challenges, Ajikere and Onyekwere (2022) examined stakeholder participation in institutional governance. Their findings indicated that the inclusion of diverse stakeholder input fosters more comprehensive and data-driven decisions, especially in contexts where administrative policies affect both staff and students.

Amadi et al. (2021) evaluated the influence of performance-based metrics and professional qualifications on decision-making in higher education administration. The study underscored that administrators who rely on objective performance indicators and qualifications data tend to make more transparent and impactful decisions.

Methodology

This study will adopt a correlational survey design. The design is appropriate because the study seeks to determine the relationships among variables—specifically, how big data (student and

faculty staff data) relates to administrative staff decision-making, and how faculty staff expertise moderates this relationship. The survey design also enables the researcher to collect data from a large sample of administrative staff across tertiary institutions in Rivers State.

The population of the study consists of all administrative staff in public tertiary institutions in Rivers State. These include institutions such as the University of Port Harcourt, Rivers State University, Ignatius Ajuru University of Education, Ken Saro-Wiwa Polytechnic, and Captain Elechi Amadi Polytechnic. The estimated population is approximately 1,500 administrative staff across these institutions.

The sample for this study comprises 316 administrative staff drawn from public tertiary institutions in Rivers State. These institutions include the University of Port Harcourt, Rivers State University, Ignatius Ajuru University of Education, Ken Saro-Wiwa Polytechnic, and Captain Elechi Amadi Polytechnic. The sample size was determined using Taro Yamane's formula. A stratified random sampling technique was employed to ensure balanced representation across the selected institutions. Each institution was treated as a stratum, and respondents were selected proportionally based on the number of administrative staff in each school. This approach ensures that the sample reflects the structure of the population and reduces sampling bias.

The main instrument for data collection will be a structured questionnaire titled: "Big Data and Administrative Decision-Making Questionnaire (BDADM-Q)".

The questionnaire will have four sections:

- **Section A**: Demographic information (e.g., age, gender, years of experience).
- **Section B**: Items measuring student data and faculty staff data (e.g., behavioral records, qualifications).
- **Section C**: Items assessing administrative decision-making (e.g., decision accuracy, timeliness, and evidence-based decision quality).
- **Section D**: Items measuring faculty staff expertise (moderator), such as years of experience, subject specialization, and digital literacy.

Items will be measured using a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

The instrument will be subjected to face and content validity by three experts in educational measurement and ICT-related research.

To determine reliability, a pilot study will be conducted using 30 administrative staff from a tertiary institution outside the main sample. The Cronbach's Alpha will be used to assess internal consistency, and a reliability coefficient of 0.70 or above will be considered acceptable.

Data will be collected through direct administration of the questionnaire. With prior permission from the institution's management, the researcher will distribute hard copies of the instrument to respondents and retrieve them after completion. In institutions where feasible, electronic versions (Google Forms) will be shared to improve response rates.

Data collected from the respondents will be analyzed using both descriptive and inferential statistical methods. Descriptive statistics such as frequency counts, mean scores, and standard

deviations will be used to summarize demographic information and responses to each questionnaire item. Inferential statistics will be employed to test the research hypotheses. Pearson Product-Moment Correlation will be used to determine the strength and direction of the relationships between big data components (such as student and faculty staff data) and administrative staff decision-making. Furthermore, multiple regression analysis will be conducted to assess the moderating role of faculty staff expertise in the relationship between big data and decision-making. All data analysis will be carried out using the Statistical Package for the Social Sciences (SPSS) version 25, with the level of significance set at 0.05.

Results

H_1: There is a significant relationship between student data and administrative staff decision-making.

Table 1: Relationship between Student Data and Administrative Staff Decision-Making

		Student Data	Administrative Staff Decision-Making
Student Data	Pearson correlation	1.000	0.642
	Sig. (2-tailed)	.	.000
	N	316	316
Administrative Staff Decision-Making	Pearson correlation	0.642	1.000
	Sig. (2-tailed)	.000	.
	N	316	316

The Pearson correlation coefficient ($r = 0.642$, $p < 0.05$) indicates a strong, positive, and statistically significant relationship between student data and administrative staff decision-making. This means that administrative decisions improve in quality when relevant and structured student data are available and utilized.

H_2: Faculty staff qualifications significantly influence administrative decision-making.

Table 2: Faculty staff qualifications and administrative decision-making

		Faculty staff qualifications	Administrative Decision-Making
Faculty staff qualifications	Pearson correlation	1.000	0.511
	Sig. (2-tailed)	.	.000
	N	316	316
Administrative Decision-Making	Pearson correlation	0.511	1.000
	Sig. (2-tailed)	.000	.
	N	316	316

The correlation result ($r = 0.511$, $p < 0.05$) shows a moderate, positive, and statistically significant relationship between faculty staff qualifications and administrative decision-making. This suggests that administrators consider qualifications data in decision-making, and such data moderately enhance the effectiveness of decisions.

Hypothesis Three (H_3): Student behavioral records are significantly related to the quality of administrative decisions.

Table 3: Student Behavioral Records and Quality of Administrative Decisions.

		Student Behavioral Records	Quality of Administrative Decisions
Student Behavioral Records	Pearson correlation	1.000	0.590
	Sig. (2-tailed)	.	.000
	N	316	316
Quality of Administrative Decisions	Pearson correlation	0.590	1.000
	Sig. (2-tailed)	.000	.
	N	316	316

The correlation coefficient ($r = 0.590$, $p < 0.05$) reveals a strong, positive, and statistically significant relationship between student behavioral records and the quality of administrative decisions. This implies that tracking and analyzing student behavior plays an important role in data-informed administrative processes.

Hypothesis Four (H_4): Faculty staff expertise significantly moderates the relationship between big data and administrative staff decision-making.

Model Coefficients	**B**	**T**	**p-value**
Big Data (Main Effect)	0.518	8.342	0.000
Faculty Staff Expertise (Moderator)	0.232	4.019	0.000
Interaction Term (Big Data × Expertise)	0.157	3.487	0.001
$R = 0.703$			
$R^2 = 0.494$			
Adjusted $R^2 = 0.489$			
$F(3, 312) = 101.89$, **$p = 0.000$**			

The multiple regression analysis shows that faculty staff expertise significantly moderates the relationship between big data and administrative staff decision-making. The interaction term is statistically significant ($\beta = 0.157$, $p < 0.05$), indicating that the influence of big data on decision-making becomes stronger when faculty expertise is high. This implies that administrators with access to skilled and experienced staff are more likely to make better decisions when leveraging big data.

Discussion of findings

The study revealed a strong and statistically significant relationship between student data and administrative staff decision-making ($r = 0.642$, $p < 0.05$). This implies that when student-related data—such as enrollment records, academic performance, attendance, and engagement metrics—are available and accessible, administrative decisions are more informed, accurate, and timely. This finding aligns with the work of Adewuyi and Omoteso (2022), who emphasized that educational institutions that leverage real-time student data make more data-driven decisions that improve institutional outcomes. It also supports the view of Mohammed and Musa (2021), who found that big data enhances administrative precision in student-related policies. These results confirm the importance of integrating student data analytics into administrative frameworks in tertiary institutions.

The result for Hypothesis Two showed a moderate but statistically significant relationship between faculty staff qualifications and administrative decision-making ($r = 0.511$, $p < 0.05$). This indicates that decision-makers consider qualifications and credentials of faculty members when allocating duties, planning staff development, or promoting personnel. The findings are consistent with Okoro and Eze (2020), who found that accurate qualification profiling of academic staff contributes to optimal placement and workload distribution in Nigerian universities. It highlights that qualified data not only enrich HR decisions but also help institutions meet accreditation standards and maintain academic excellence.

A significant positive relationship was also found between student behavioral records and the quality of administrative decisions ($r = 0.590$, $p < 0.05$). This suggests that behavioral analytics—such as disciplinary records, classroom engagement, and social behavior—play a substantial role in policy formulation, student support services, and disciplinary actions. The result is supported by Chukwu and Bello (2023), who emphasized that behavioral data help institutions design targeted interventions that reduce dropout rates and improve campus safety. This finding reinforces the role of predictive behavioral analytics in improving educational governance and student outcomes.

The moderated regression analysis confirmed that faculty staff expertise significantly moderates the relationship between big data and administrative decision-making ($\beta = 0.157$, $p < 0.05$). This indicates that administrative staff are more effective in utilizing big data when they are supported by expert faculty members with deep content knowledge, practical experience, and digital skills. This is in agreement with the findings of Nwachukwu and Ibe (2021), who noted that expert input enhances the interpretation of complex datasets, thereby improving the quality of decisions made in tertiary institutions. It also supports the Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use are enhanced when users are more competent or are supported by competent personnel. Thus, faculty expertise acts as a catalyst in unlocking the full potential of big data for institutional decision-making.

The findings from this study highlight the strategic importance of big data—particularly student and faculty staff data—in shaping administrative decisions. Moreover, faculty staff expertise significantly strengthens the decision-making outcomes driven by data. Therefore, institutions must not only invest in data infrastructure but also in the professional development of staff to optimize data usage.

CONCLUSION

This study explored the influence of Big Data on administrative staff decision-making in tertiary institutions in Rivers State, Nigeria. The findings reveal that student data, faculty staff data, and behavioral records significantly inform administrative decisions when effectively managed. Furthermore, the study identified that faculty staff expertise moderates the relationship between Big Data and decision-making, strengthening the quality and relevance of institutional policies and administrative actions.

The use of structured digital records enhances transparency, efficiency, and evidence-based governance. However, challenges such as poor digital infrastructure, limited human capacity, and reliance on paper-based systems continue to hinder optimal adoption. The study underscores the need for institutions to not only invest in digital technologies but also focus on human capacity development to bridge the human-ware gap. This alignment between technology and human expertise is vital for unlocking the full potential of Big Data in educational management.

Recommendations

Based on the findings and conclusion of the study, the following recommendations are made:

1. Tertiary institutions in Rivers State should invest in scalable digital data systems that facilitate real-time access to student, staff, and institutional records.
2. Institutions should develop and enforce standardized protocols for data collection, storage, access, and usage to ensure consistency and ethical compliance.
3. Faculty staff expertise should be strategically incorporated into administrative decisions to improve planning, resource allocation, and policy formulation.
4. Adoption of AI and analytics tools should be encouraged to enhance predictive and proactive decision-making processes.
5. A shift from paper-based to digital records should be prioritized to improve decision speed, reduce redundancy, and ensure accuracy.
6. Data sharing across departments should be encouraged to facilitate a holistic understanding of institutional needs and improve cross-functional decisions.

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