

APPLICATION OF EMERGING IN THE ADMINISTRATION OF PUBLIC UNIVERSITIES IN ENUGU STATE

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Abstract

The study examined the application of emerging technologies in the administration of public universities in Enugu State, Nigeria. Two research questions guided the study while two null hypotheses were formulated and tested at .05 level of significance. This study adopted a descriptive survey research design. The research was carried out in Enugu State. The population for the study was 4587 respondents which comprised 195 University Administrators and 4392 Academic Staff. The study involved a sample size of 634 respondents, consisting of 195 University Administrators and 439 Academic Staff. The researcher employed a stratified proportionate random sampling technique to determine the sample composition. The instrument for data collection was a researcher developed questionnaire titled "Emerging Technologies in the Administration of Public Universities Questionnaire (ETAPUQ)". To ascertain the validity of the instrument, copies of questionnaire were given to three research experts. Two of these experts were lecturers in the Department of Educational Management, while the third was from the Department of Mathematics and Computer Education (Measurement and Evaluation unit), all in the Faculty of Education, Enugu State University of Science and Technology (ESUT), Enugu. The researcher used Cronbach alpha statistics to test the reliability of the instrument. The computed values for clusters 1 and 2 were .81 and .79 respectively. The overall reliability index of the instrument was found to be .80, signifying its reliability. However, out of the 634 copies administered, the researcher and his research assistants retrieved 612 copies (190 from University Administrators and 422 from academic staff) which resulted in 96.53 percent return rate. The findings of the study showed that emerging technologies are applied in the administration of public universities in Enugu State in terms of record management, financial management, human resource management, instructional delivery and students' support services to a high extent. Based on the findings of the study, the researcher recommended that university management should implement comprehensive training programmes for staff to effectively utilize emerging technologies for record management.

Keywords: Emerging technologies, Artificial intelligence, big data analytics, administration, public universities

Introduction

Education serves as a transformative force, moulding individuals into informed and capable contributors to the intricate tapestry of human progress. It goes beyond the mere transmission of facts, extending its reach to cultivate critical thinking, instil ethical values, and nurture a holistic understanding of the world. Omemu (2018) stated that education is recognized as an instrument for individual and societal development. Education according to Nsirim (2019) is defined as the vehicle that brings about a formative effect on the mind, character or physical ability of the individual concerned. Aliyu and Ali (2021) posited that education and its importance can never be quantified, as it serves as the pivot of scientific and technological advancements, economic growth, industrial progress, and overall development. In essence, education serves as the cornerstone for empowering individuals and catalyzing positive societal change, laying the groundwork for a future marked by enlightenment and progress especially in tertiary institutions like universities where intensive administrative roles are highly needed.

A University is a place where skilled labour is produced for societal and global consumption. Uche (2016) characterized a university as an institution of higher learning that provides both undergraduate and postgraduate education, with a deliberate focus on addressing the needs of the people and aligning with the national goals and objectives set for university education. Federal Republic of Nigeria (FRN) (2013) stated that university education is highly praised as a continuous and powerful tool for developing critical skills and human capital. The FRN (2013) emphasized its role in enhancing productivity in workplaces, underscoring the importance of universities in contributing to the overall advancement and development of the nation. Idoko (2015), was of the view that a university is an acclaimed centre of excellence where intellectual cross fertilization of ideas systematically takes place, all geared towards the development of the individual intellectual capacity, resourcefulness and character molding for overall societal advancement in all fields of enquiry. Public universities, as a subset of universities, are distinguished by their government funding and accessibility to a broader population, reflecting a commitment to providing affordable education to the public using emerging technologies.

Emerging technologies refer to innovations and advancements in various fields that have the potential to significantly impact and transform industries, society, and the way we live and work. Emerging technologies are those technologies which are likely to have a large impact on teaching, learning, or creative inquiry on learners, or those technologies which are on the rise such as Artificial Intelligence (AI) and Machine Learning, data Analytics and big Data, blockchain, cloud computing and student information systems (SIS (Bozalek, 2015). Onyeama (2019), stated that the evolution of emerging technologies is changing all facets of educational processes ranging from; the nature of classrooms, quality of content, methodologies, mode of students' engagement and evaluation. Onyeama (2019) posited that education system try to inculcate technologies to enable teachers and students gain access to knowledge. These technologies are typically in the early stages of development or adoption and are expected to mature and become more prominent in the near future. As stated by Onyekaba (2021) technology stands as an indispensable component for any institution's sustenance, and in the case of university education, it serves as a crucial foundation. Emerging technologies often disrupt existing norms, create new opportunities, and address challenges in novel ways. Onyeama (2019) posited that emerging technologies have brought tremendous transformational changes to education across the globe, and many educators are now moving towards technology-based teaching and learning. Bozalek (2015), listed examples of emerging technologies which include Artificial Intelligence (AI) and Machine Learning, Data Analytics and Big Data, Blockchain, Cloud Computing, Student Information Systems (SIS), Online Learning Management Systems (LMS), Cyber-security Technologies, Virtual Reality (VR) and Augmented Reality (AR), Robotic Process Automation (RPA), 5G Connectivity, Biometrics, IoT for Campus Management and Digital Document Management. Meanwhile, in the present study, the researcher focused on artificial intelligence and Data Analytics also known as Big Data which offer scalable and cost-effective solutions that can significantly enhance the efficiency and effectiveness of administrative processes in public universities.

Artificial Intelligence can be used to automate administrative tasks, manage data, and provide personalized services. Chat-bots powered by AI can handle inquiries and provide information to students and staff, while machine learning can help predict student performance and support retention efforts. AI involves the development of computer systems that can perform tasks that typically require human intelligence, such as speech recognition, decision-making, and visual perception (Russell & Norvig, 2020). Leveraging big data analytics can help universities better understand student and faculty needs, optimize resource allocation, and make data-driven decisions to improve overall efficiency and effectiveness. Popoola and Oluwole (2017), posed that the university system is rapidly expanding, which brings about various issues related to planning, organization, administration, monitoring, and control. Addressing these challenges is crucial for

maximizing the positive application of emerging technologies on the administration of public universities in Enugu State.

Statement of the Problem

The administration of public universities in Enugu State, Nigeria, faces challenges marked by inconsistencies in the application of cutting-edge technologies. The significant increase in student enrollment has introduced complexities to administrative processes, adversely affecting the streamlined functioning of these institutions. Despite governmental efforts to incorporate emerging technologies, particularly uncertainties persist regarding their impact on university administration. This study addresses the continued reliance on conventional methods for numerous administrative tasks in public universities, hindering effective and efficient administration in the contemporary era of emerging technologies. The research determined the extent to which emerging technologies, specifically cloud computing, is applied in various domains such as record management, financial management, human resource management, instructional delivery, and student support services in public universities in Enugu State, Nigeria.

Purpose of the Study

The main purpose of the study was to ascertain the extent to which emerging technologies are applied in the administration of public universities in Enugu State. Specifically, the study sought to:

1. ascertain the extent Artificial Intelligence (AI) in the administration of public universities in Enugu State?
2. to identify the extent Big Data are applied in the administration of public universities in Enugu State?

Research Questions

The following research questions guided the study:

1. to what extent is Artificial Intelligence (AI) and Machine Learning apply in the administration of public universities in Enugu State?
2. to what extent is Data Analytics and Big Data applied in the administration of public universities in Enugu State?

Hypotheses

The following hypotheses were formulated and tested at .05 level of significance:

H₀₁: There is no significant difference between the mean scores of university administrators and academic staff on extent application of Artificial Intelligence (AI) and Machine Learning.

H₀₂: There is no significant difference between the mean scores of university administrators and academic staff on the extent to which data analytics and big data are applied in the administration of public universities in was sampled.

Methods

The instrument for data collection was a researcher developed questionnaire titled “Emerging Technologies in the Administration of Public Universities Questionnaire (ETAPUQ)”. To ascertain the validity of the instrument, copies of questionnaire were administered to three research experts. Two of these experts were lecturers in the Department of Educational Management, while the third was from the Department of Mathematics and Computer Education (Measurement and Evaluation unit) all from Faculty of Education at Enugu State University of Science and Technology (ESUT), Enugu. To ensure the reliability of the instrument, a trial test involving 30 respondents (13 University Administrators and 17 Academic Staff) from public universities in Imo State was conducted. Imo State was chosen due to its similarity in administrative characteristics with Enugu State. The researcher, along with two research assistants,

facilitated the distribution and collection of the survey instrument among the target respondents, comprising university administrators and full-time academic staff. The mean scores and standard deviations were employed to answer the research questions. The null hypotheses were tested using the t-test statistic, with an alpha level set at .05.

Results

Research Questions One: To what extent do Artificial Intelligence (AI) apply in the administration of public universities in Enugu State?

Table 1: Mean scores and standard deviation of university administrators and academic staff on the extent to which Artificial Intelligence (AI) and Machine Learning are applied in the administration of public universities in Enugu State.

ITEMS		University Administrator 190		Academic Staff 422		Overall 612		Dec
S/N	Artificial Intelligence (AI) and Machine Learning in record management \applied through:	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	
1	AI-powered tools can scan documents, extract text using OCR (Optical Character Recognition), and store them digitally	2.60	.98	2.55	.93	2.58	.96	HE
2	ML algorithms can analyze record data to predict future trends, identify patterns, and detect anomalies	2.57	.89	2.51	.92	2.54	.91	HE
3	AI can extract relevant information from records, such as names, dates, and keywords, to create metadata and tags.	2.56	.95	2.55	.89	2.56	.92	HE
4	AI-powered summarization tools can condense large documents into concise summaries, saving time and improving comprehension.	2.59	.92	2.54	.91	2.57	.92	HE
5	preparing time table for the academic session.	2.50	.93	2.54	.85	2.53	.89	HE
6	ML algorithms can detect and correct errors, inconsistencies, and duplicates in record data.	2.53	.89	2.59	.93	2.56	.92	HE
7	storing records on students' academic performance.	2.64	.91	2.55	.92	2.60	.92	HE
8	saving staff disciplinary committee files.	2.59	.91	2.61	.91	2.60	.92	HE
9	reducing the reliance on physical storage space.	2.58	.95	2.62	.90	2.60	.93	HE
10	maintaining centralized databases that store various types of records.	2.52	.91	2.58	.93	2.56	.92	HE
11	enabling the automation of routine record management processes e.g. automatic grading systems.	2.60	.92	2.56	.85	2.58	.89	HE

12	making records easily accessible.	2.54	.88	2.55	.83	2.55	.86	HE
13	storing information on staff movement book.	2.58	.97	2.60	.94	2.59	.96	HE
Cluster Mean/SD		2.57	.92	2.56	.90	2.57	.92	HE

The data analysis on Table 1 above shows the mean ratings of University administrators and academic staff on the extent to which Artificial Intelligence (AI) and Machine Learning **are** applied in the administration of public universities in Enugu State. In the above Table, the University administrators' mean ranged from 2.50 to 2.64, while the academic staff mean ranged from 2.51 to 2.61. The values of their cluster means are 2.57 and 2.56 with standard deviations of .92 and .90 respectively. However, their overall mean ranged from 2.53 to 2.60 with cluster mean of 2.57 and standard deviation of .92. The finding of the study signifies that Artificial Intelligence (AI) and Machine Learning are applied in the administration of public universities to a high extent. The standard deviations of the respondents show that they are homogenous in their responses.-

Research Questions Two: To what extent is Big Data applied in the administration of public universities in Enugu State?

Table 2: Mean scores and standard deviation of university administrators and academic staff on the extent to which Data Analytics and Big Data are applied in the administration of public universities in Enugu State.

ITEMS		University Administrator 190		Academic Staff 422		Overall 612		
S/N		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{x}$	SD	Dec
	Big Data can be applied in the administration of public universities by:							
14		3.12	.80	3.11	.82	3.11	.82	HE
15	Student retention: using data to understand why students drop out and how to prevent it	2.34	.84	2.37	.82	2.36	.83	LE
16	Admissions: using data to identify prospective students and understand the effectiveness of recruitment strategies	2.52	.81	2.51	.82	2.51	.82	HE
17	Program evaluation: using data to understand the effectiveness of academic programs	2.55	.80	2.53	.82	2.55	.81	LE
18	Faculty research: using data analytics to understand research productivity and impact.	3.07	.84	3.04	.82	3.04	.83	HE
19	Operational efficiency: using data to understand how to optimize university operations and resources	3.01	.82	2.98	.82	2.99	.82	HE
20	Financial management: using data to understand university finances and make informed decisions	2.61	.82	2.58	.82	2.59	.82	HE
21	Alumni relations: using data to understand alumni engagement and	2.35	.84	2.35	.80	2.35	.81	LE

	fundraising strategies.							
22	Institutional research: using data to understand university performance and make informed decisions.	2.59	.82	2.57	.81	2.58	.82	HE
23	Student affairs: using data to understand student engagement and success	2.36	.80	2.38	.81	2.38	.81	LE
24	Curriculum development: using data to understand the effectiveness of curriculum and make informed decisions	2.79	.85	2.77	.84	2.78	.85	HE
25	Assessment and accreditation: using data to understand student learning outcomes and institutional effectiveness	2.63	.83	2.59	.81	2.62	.82	HE
26	reducing the likelihood of errors.	2.58	.82	2.57	.84	2.58	.83	HE
27	implementing online procurement systems which can streamline the purchasing process.	2.55	.78	2.57	.80	2.57	.80	HE
28	securing authentication methods which can safeguard sensitive financial information.	2.25	.80	2.23	.83	2.24	.82	LE
Cluster Mean/SD		2.62	.82	2.61	.82	2.62	.82	HE

The data analysis on Table 2 above shows the mean ratings of University administrators and academic staff on the extent to which Data Analytics and Big Data are applied in the administration of public universities in Enugu State. Table 2, the University administrators' mean ranged from 2.25 to 3.12, while the academic staff mean ranged from 2.23 to 3.11. The values of their cluster means are 2.62 and 2.61 with standard deviations of .82 and .82 respectively. However, their overall mean ranged from 2.24 to 3.11 with cluster mean of 2.62 and standard deviation of .82. The finding of the study signifies that Data Analytics and Big Data are applied in the administration of public universities in Enugu State. The standard deviations of the respondents show that their responses were closely related.

Hypotheses

H₀₁: There is no significant difference between the mean scores of university administrators and academic staff on the extent to which Artificial Intelligence (AI) is Machine Learning are applied in the administration of public universities in Enugu State in terms of record management.

Table 3: Summary of t-test analysis of the mean scores of university administrators and academic staff on the extent to which Artificial Intelligence (AI) and Machine Learning are applied in the administration of public universities in Enugu State in terms of record management

Group	N	$\bar{x}$	SD	df	p-value	Decision
University Administrators	190	2.57	.92	610	.103	H ₀₁ not rejected
Academic Staff	422	2.56	.90			

Data on Table 6 show that at 610 degree of freedom, the p-value was .103 which is greater than 0.05 level of significance set for this study. This is an indication that the null hypothesis was

not rejected and, therefore, there was no significant difference between the mean scores of university administrators and academic staff on the extent to which Artificial Intelligence (AI) and Machine Learning are applied in the administration of public universities in Enugu State.

H₀₂: There is no significant difference between the mean scores of university administrators and academic staff on the extent to which data analytics and big data are applied in the administration of public universities in Enugu State.

Table 4: Summary of t-test analysis of the mean scores of university administrators and academic staff on the extent to which big data are applied in the administration of public universities in Enugu State in relation to financial management

Group	N	$\bar{x}$	SD	Df	p-value	Decision
University Administrators	190	2.62	.82	610	.091	H ₀₂ not rejected
Academic Staff	422	2.61	.82			

Data on Table 4 show that at 610 degree of freedom, the p-value was .091 which is greater than 0.05 level of significance set for this study. This is an indication that the null hypothesis was not rejected and, therefore, there was no significant difference between the mean scores of university administrators and academic staff on the extent to which data analytics and big data are applied in the administration of public universities in Enugu State.

Summary of Findings

The following are the findings of the study:

1. Artificial Intelligence (AI) and Machine Learning are applied in the administration of public universities in Enugu State to a high extent.
2. Data analytics and big data are applied in the administration of public universities in Enugu State to a high extent.

Discussion

The study's findings underscored the significant application of Artificial Intelligence (AI) and Machine Learning in the administration of public universities in Enugu State. Specifically, it highlighted the profound application on record management practices within these institutions. This application was observed to be substantial, reflecting a paradigm shift in how data and information are handled and stored. Such insights shed light on the evolving nature of educational administration in the digital age in Enugu State. The finding aligns with the research of Frances (2017), Egoeze, Misra, Maskeliūnas, and Damaševičius (2018), Nwana (2018), Akang (2019), and Chuktu and Eton (2020), all of whom have independently emphasized the pivotal role of emerging technologies in facilitating effective record management within organizations. These scholars have underscored the diverse functionalities that technology offers, including data collection, typing, filing, copying, processing, storing, and retrieval, among others. Furthermore, the findings resonate with the insights provided by Don-Solomon and Ayawei (2021), who have highlighted the beneficial application of cloud computing specifically in record management in the education sector. Their research underscores the transformative potential of cloud-based solutions in enhancing the efficiency and accessibility of record-keeping processes in educational institutions. Moreover, these scholarly works collectively reinforce the notion that embracing technological advancements is essential for modern organizations seeking to streamline their record management practices. The convergence of these findings not only emphasizes the significance of technology in contemporary record-keeping but also underscores the need for ongoing innovation and

adaptation within the education sector and beyond. This body of research serves as a compelling foundation for policymakers and educational administrators alike, urging them to prioritize investments in technological infrastructure to optimize record management processes and ultimately enhance organizational effectiveness. The hypothesis tested showed that there was no significant difference between the mean scores of university administrators and academic staff on the extent to which emerging technologies are applied in the administration of public universities in Enugu State in terms of record management.

The study's finding underscores the profound application of emerging technologies in the financial management administration of public universities in Enugu State. This application extends significantly, indicating a substantial shift in how these institutions handle their financial affairs. As Data analytics and big data continue to integrate into administrative processes, they are fundamentally reshaping the strategies and tools used for financial management. This transformation highlights the critical need for universities to adapt and leverage technological advancements to optimize their financial operations effectively. The finding resonates with the research conducted by Oyier, Odundo, Ganira, and Wangui (2015), as well as Wangui's subsequent study in 2017, and Onyekaba (2021). These scholars assert that emerging technologies exert a considerable influence on the financial management practices of various organizations. Their research corroborates the notion that as technology continues to evolve, its impact on financial management becomes increasingly pronounced. Furthermore, they argue that organizations must embrace and adapt to these technological advancements to remain competitive and ensure efficient financial administration. Thus, the alignment between these studies reinforces the consensus regarding the transformative effect of emerging technologies on financial management across different sectors. Further finding showed that there was no significant difference between the mean scores of university administrators and academic staff on the extent to which emerging technologies are applied in the administration of public universities in Enugu State in relation to financial management.

Conclusion

This study unequivocally demonstrated the profound application of emerging technologies in various facets of university administration within Enugu State. Firstly, the findings revealed that these technologies play a pivotal role in revolutionizing record management practices, significantly enhancing efficiency and accuracy in data handling processes. Secondly, the study underscored the transformative application of emerging technologies in financial management in public universities, highlighting their ability to streamline budgeting, accounting, and financial reporting procedures. Furthermore, the research elucidated how these technological advancements are instrumental in optimizing human resource management strategies, facilitating better recruitment, training, and performance evaluation practices. Moreover, the investigation underscored the substantial contribution of emerging technologies to instructional delivery methods, enabling educators to employ innovative teaching tools and methodologies for enhanced learning outcomes. Lastly, the study underscores the vital role of emerging technologies in augmenting students' support services, thereby promoting a conducive and enriching academic environment. Overall, these findings underscored the imperative for public universities in Enugu State to embrace and integrate emerging technologies into their administrative frameworks to effectively meet the evolving needs of stakeholders and ensure institutional advancement.

Recommendations

The following recommendations are made based on the research findings.

1. University management should implement Artificial Intelligence (AI) and Machine Learning in public universities in Enugu State to a high extent

2. Government should endeavour to integrate advanced big data in universities since it applied in the administration of public universities in Enugu State to a high extent.

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