

DATA-DRIVEN APPROACHES TO ENHANCING STAFF DEVELOPMENT IN RIVERS STATE PUBLIC UNIVERSITIES

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Abstract

The study investigated data-driven approaches to enhancing staff development in Rivers State Public Universities. The study was guided by three research questions and three corresponding hypotheses. The study adopted a descriptive survey design. The population of this study consisted of 3678 teaching and non-teaching staff in two state-owned universities; Rivers State University (RSU) 2705 and Ignatius Ajuru University of Education (IAUE) 973 staff totaling 3678. A sample size of 364 was adopted for this study. The figure was realized through the use of Taro Yamane's formula. Thereafter, two sampling techniques were utilised in selecting the respondents within the sample size of 364 staff. First the researcher adopted proportional sampling technique in selecting 224 respondents from RSU and 140 respondents from IAUE. The same sampling technique was used in selecting respondent from both teaching and non-teaching staff in the above universities. The researcher used a questionnaire for data collection titled "Data-Driven Approaches to enhancing staff development in public universities in Rivers State Questionnaire (DDAESDQ)". The reliability of the instrument was obtained using Cronbach Alpha which gave a reliability index of 0.78. Data collected were analysed using mean and standard deviation statistics for the research questions while t-test inferential statistics was used to test the null hypotheses at 0.05 level of significance. The study concluded that the various approaches contributes to staff development in unique ways, from identifying skills gaps and improving training quality to enabling more objective evaluations and anticipating future skill needs. The study recommends among others that university administrators should invest in implementing robust learning analytics systems to help identify skills gaps, track academic and non-teaching staff progress, and improve the quality and targeting of training programmes.

Keywords: *Data-Driven Approaches, Staff Development, Learning Analytics, Performance Analytics and Predictive Analytics.*

Introduction

Staff development are critical components in the success of any educational institution. Staff development has to do with the processes and activities designed to enhance the skills, knowledge, and competencies of academic and non-teaching

staff of public universities. These includes professional development programmes such as training workshops, seminar, academic conferences and continuous education opportunities provided by the university management aimed at improving teaching practices, administrative efficiency, and research capabilities in order to meet global practices

and student needs. (Adebayo and Oggunniyi, 2018). Staff development has gathered tremendous attention in recent years, especially within Nigerian public universities. As these institutions try their best to maintain their competitive edge and meet the increasing demands of the global academic community, the need for innovative approaches to staff development enhancement has become important in the school system. This is particularly relevant in Rivers State, where public universities face unique challenges and opportunities in the Nigerian educational system.

Data-driven approaches have emerged as powerful tools in this pursuit, offering a systematic and evidence-based methodology for identifying areas of improvement, designing targeted interventions, and measuring the impact of development initiatives. These approaches leverage the vast amounts of data generated within university systems to inform decision-making processes and drive continuous improvement. (Okoye and Ezeanolue, 2019).

The importance of staff development programmes awaken the consciousness among staff to be constantly renewed and abreast with the changes in the academic system through staff development programmes. According to Omeodu and Amadi (2018), the functions of academic and non-teaching in universities are not only multiple but also continuously changing in modern societies. This suggests the need for this category of staff to continuously undertake relevant development programmes. The competency of the management staff is usually observed in their interactions with other staff, their leadership roles, assessment of other staff, dealing with disciplinary issues, as well as other university activities. Likewise, the teaching staff of the institutions, their effectiveness in performing their functions of teaching and assessing the students demonstrated their level of professional training they have undergone in the course of their teaching, and skills deploy in carrying out their teaching job. Omeodu and Amadi (2018), further stressed that these categories of staff can be developed through data-driven approaches such as learning analytics, performance analytics and predictive analytics in enhancing staff development in public universities in Rivers State.

Learning analytics, for instance, utilizes data from learning management systems and other educational technologies to

gain insights into staff learning patterns, preferences, and outcomes. This information can be used to tailor professional development programmes and optimize learning experiences for university personnel as posited by Omoregie and Igbinedion, (2017). Learning analytics involves the collection and analysis of data related to the learning processes and experiences of staff. By examining metrics such as participation in professional development programmes, engagement with training materials, and feedback from workshops, educational leaders can identify areas where staff need further support. For example, if data shows that certain training modules are underutilized, targeted interventions can be implemented to encourage participation and ensure that staff receive the necessary resources to improve their skills and knowledge.

Performance analytics is another data-driven approach that focuses on measuring and analyzing staff performance metrics. By collecting and analyzing data on key performance indicators, universities can identify trends, pinpoint areas for improvement, and implement targeted interventions to boost staff productivity and effectiveness (Akinwale and Okebukola, 2020). This is particularly relevant in public universities in Rivers State, where resource constraints often necessitate efficient allocation and utilization of human capital.

Predictive analytics has also gained traction in the area of staff development, enabling institutions to forecast future performance trends and proactively address potential challenges. By leveraging on historical data and advanced statistical models, universities can anticipate the needs of academic and non-teaching staff, identify at-risk employees, and implement preemptive strategies or measures to ensure work proficiency in the school system. (Nwankwo and Abanobi, 2018). These data-driven approaches enhance staff development by providing a more nuanced and objective understanding of the factors influencing staff effectiveness in Rivers State public universities. By basing decisions on empirical evidence rather than intuition or tradition, these institutions can allocate resources more efficiently, design more targeted interventions, and achieve better outcomes in terms of staff development and overall institutional performance.

Together, these analytics approaches enable a comprehensive understanding of staff development needs and outcomes. Learning analytics provides insights into engagement and participation, performance analytics evaluates the effectiveness of development initiatives, and predictive analytics anticipates future challenges and opportunities. By utilizing these data-driven methods, public universities in Rivers State can create a responsive staff development strategy that continuously develops or meet their needs and enhance overall institutional performance.

In exploring data-driven approaches to enhancing staff development in public universities in Rivers State, several scholars have conducted empirical reviews but not exhaustive. One such study by Owan (2020) focused on the impact of data management practices on educational research quality in higher education. Owan (2020) further found that effective data management significantly enhances the quality of academic research by university lecturers, which in turn contributes to improved staff development. The study highlights the importance of structured data collection and analysis in identifying and addressing staff training needs, ultimately leading to better research outcomes and professional growth for university staff

Again, through the review of other studies, it was discovered that the area of data-driven approaches to enhancing staff development in public universities in Rivers State is very scanty in the literature, but not relatively new. Data driven approaches has not really been captured when compared with staff development. The review showed that almost all the related studies cited, were conducted in Southeastern parts of Nigeria, with only one study which was conducted in South-South part of Nigeria where Rivers State falls under. No foreign studies were found which are related to this study. In terms of approach and research dimensions, it was observed that all the studies had used varying methods, sample sizes, areas of studies, and instruments. The present study also adopted a unique and different approach from all other studies. It was based on the scarcity of research evidence on data-driven approaches to enhancing staff development that necessitated this study, as one of the means of bridging the identified gaps.

Generally, the study aims to investigate data-driven

approaches in enhancing staff development in public universities in Rivers State. Specifically, the objectives are: to examine the extent learning analytics, enhance staff development in public universities in Rivers State, to investigate the extent performance analytics, enhance staff development in public universities in Rivers State and to ascertain the extent predictive analytics. enhance staff development in public universities in Rivers State.

Contribution of the Research

Previous studies have attempted to show the importance of data-driven approaches to enhancing staff development, others have also attempted to mention some data driven approaches that must be adhered to enhancing staff development. To the researchers' knowledge, this study is the first to link data driven approaches to staff development in area of learning analytics, Performance analytics and Predictive analytics. This study contributes to the existing body of knowledge by addressing the gaps arising from the paucity of research literature on staff development.

Statement of the Problem

In public universities, staff development is crucial for ensuring that both academic and non-teaching staff are equipped with the skills, knowledge, and competencies required to maintain high standards of education and administration. Ideally, continuous professional development should be in place, including training workshops, mentorship programmes, and other development initiatives to help staff adapt to evolving educational demands and global standards.

However, it appears that despite these efforts, staff development in public universities in Rivers State may not be meeting its objectives. This presumed problem could be due to a lack of targeted training programmes that address specific needs, inadequate follow-up on training outcomes, and limited access to continuous learning opportunities. The effectiveness of traditional staff development methods might not be sufficient to cope with the current challenges faced by these institutions. To address these issues, data-driven approaches such as learning analytics, performance analytics, and predictive analytics could be employed. These methodologies can offer a systematic way to identify areas

for improvement, design targeted interventions, and measure the impact of development initiatives. By leveraging data generated within university systems, educational leaders can make informed decisions to enhance staff development more effectively. While traditional staff development methods have been implemented, there is a need to explore innovative, data-driven approaches to better address the persistent challenges in staff development. This study aims to fill the gap in existing research by investigating the potential of these data-driven approaches in enhancing staff development in public universities in Rivers State.

Research Questions

The following research questions guided this study;

1. To what extent does learning analytics, enhance staff development in public universities in Rivers State?
2. To what extent does performance analytics, enhance staff development in public universities in Rivers State?
3. To what extent does extent predictive analytics, enhance staff development in public universities in Rivers State?

1.5 Hypotheses

The following null hypotheses were formulated to guide the study at 0.05 level of significance

1. There is no significant difference between the mean ratings of academic and non-teaching staff on the extent learning analytics, enhance staff development in public universities in Rivers State?
2. There is no significant difference between the mean ratings of academic and non-teaching staff on the extent performance analytics, enhance staff development in public universities in Rivers State?
3. There is no significant difference between the mean ratings of academic and non-teaching staff on the extent predictive analytics enhance staff development in public universities in Rivers State?

Methodology

The study adopted a descriptive survey design. The design is appropriate for the study because it enables the researcher to

elicit valuable information through a questionnaire on how data-driven approaches enhance staff development in public universities in Rivers State. The population of this study consisted of 3768 teaching and non-teaching staff in two state-owned universities; Rivers State University (RSU) and Ignatius Ajuru University of Education (IAUE). RSU has 2705 staff (Office of the Registrar, RSU, 2024); and IAUE has 973 (Office of the Registrar, IAUE, 2024), totaling 3678. A sample size of 364 was adopted for this study. The figure was realized through the use of Taro Yamane's formula. This number was considered enough and adequate given the statistical requirements and time frame for the study. Thereafter, two sampling techniques were used in selecting the respondents within the sample size of 364 staff.

First the researcher adopted proportionate sampling technique in selecting 224 respondents from Rivers State University and 140 respondents from Ignatius Ajuru University of Education. The same sampling technique was used in selecting respondent from both teaching and non-teaching staff in the above universities. This sampling technique is necessary because it helped the researchers in selecting respondents based on their classification (teaching and non-teaching staff) from the two state owned universities, in line with their staff strength without being bias. Then, the question is how can we distribute these questionnaires to the teaching and non-teaching staff in the above universities?

Thus, in addressing this challenge, the convenience sampling technique (accidental sampling) was employed by selecting staff that was close at hand due to the limited period of time and resource within the disposal of the researchers for the study. This sampling technique enabled the researchers to overcome some of the bureaucratic bottlenecks which initially hindered the researchers from distributing the questionnaire to some of the high-ranking officials in the two universities. Thus, the convenience sampling technique helped the researchers to fill this gap by distributing the questionnaires to the accessible staff in the universities based on their classifications. Based on convenience stratified random sampling technique was adopted to realized 205 teaching staff and 159 non-teaching staff. The researcher used a questionnaire for data collection titled "Data-Driven Approaches to enhancing staff

development in public universities in Rivers State Questionnaire (DDAESDQ)". The items were rated on a four-point modified Likert scale ranging from 4=Very High Extent, High Extent (HE), 3= Low Extent (LE), 2=Very Low Extent (VLE) =1. The scale was used to find out the respondent's agreement with the variables under study.

The instrument was validated by three experts in the Department of Educational Management in Rivers State University. To ascertain the reliability of the instrument, a test-retest was conducted on the respondents outside the sampled frame on 30 respondents. The reliability of the instrument was obtained using Cronbach Alpha (SPSS version 25) which gave a reliability index of 0.78. This proves that the instrument was highly reliable. The

Table 1: Mean and standard deviation scores on the extent learning analytics, enhance staff development in public universities in Rivers State.

S/N		VHE	HE	LE	VLE	$\bar{X}$	SD	Decision
1	Learning analytics helps identify skills gaps among staff.	126	227	5	6	3.58	0.60	HE
2	Learning analytics improves the quality of staff development programmes.	134	207	21	2	3.51	0.62	HE
3	Learning analytics helps track staff progress in development activities.	177	164	17	6	3.41	0.65	HE
4	The use of learning analytics leads to more targeted staff training.	187	140	35	2	3.41	0.67	HE
5	Staff training needs are better understood through learning analytics.	203	144	16	1	3.52	0.58	HE
Grand mean						3.49	0.46	HE

Data presented in table 1 above shows the mean scores on the extent learning analytics, enhance staff development in public universities in Rivers State. The data shows that the respondents agreed to a high extent that Learning analytics helps identify skills gaps among staff, learning analytics improves the quality of staff development programmes, learning analytics helps track staff progress in development activities, the use of learning analytics leads to more targeted staff training and staff training needs are better

instruments were administered to the respondents by the researchers. Data collected were analysed using mean and standard deviation statistics for the research questions while t-test inferential statistics was used to test the null hypotheses at 0.05 level of significance. Statistical analysis was done using the statistical package of the social science SPSS version 25

Results and Findings

Research Questions

Research Question 1: To what extent does learning analytics, enhance staff development in public universities in Rivers State?

understood through learning analytics as seen in items 1, 2, 3, 4 and 5 which have mean values above the criterion mean of 2.50. The grand mean of 3.49 indicates that the answer to research question one is that, to a high extent, learning analytics, enhance staff development in public universities in Rivers State.

Research Question 2: To what extent does performance analytics, enhance staff development in public universities in Rivers State?

Table 2: Mean and standard deviation scores on the extent performance analytics, enhance staff development in public

S/N		VHE	HE	LE	VLE	$\bar{X}$	SD	Decision
6	Performance analytics enables more objective staff evaluations.	169	162	32	0	3.38	0.64	HE
7	Performance analytics accurately identifies areas for staff improvement.	209	134	17	3	3.51	0.63	VHE
8	The effectiveness of staff training is more measurable through performance analytics.	182	164	17	0	3.45	0.62	HE
9	Staff weaknesses are more quickly identified using performance analytics.	182	164	17	0	3.45	0.59	HE
10	Performance analytics helps tailor development programmes to individual staff needs.	157	156	49	1	3.29	0.70	HE

Grand mean

are more quickly identified using performance analytics and performance analytics helps tailor development programmes

Data presented in table 2 above shows the mean scores on the extent performance analytics, enhance staff development in public universities in Rivers State. The data shows that the respondents agreed to a high extent that performance analytics enables more objective staff evaluations, performance analytics accurately identifies areas for staff improvement, the effectiveness of staff training is more measurable through performance analytics, staff weaknesses

to individual staff needs as seen in items 6, 7, 8, 9 and 10 which have mean values above the criterion mean of 2.50. The grand mean of 3.46 indicates that the answer to research question two is that, to a high extent, performance, enhance staff development in public universities in Rivers State.

Research Question 3: To what extent does predictive analytics., enhance staff development in public universities in Rivers State?

Table 3: Mean and standard deviation scores on the extent predictive analytics., enhance staff development in public universities in Rivers State

S/N		VHE	HE	LE	VLE	$\bar{X}$	SD	Decision
11	Staff development resources are allocated more efficiently using predictive insights.	124	215	24	0	3.28	0.58	HE
12	Predictive analytics helps anticipate changes in required staff skills.	123	194	44	2	3.21	0.66	HE
13	Predictive analytics enhances the ability to plan for succession in key roles.	115	191	43	14	3.12	0.76	HE
14	Predictive analytics helps identify which staff are likely to benefit most from specific training.	100	203	54	6	3.09	0.69	HE

15	Staff attrition risks are more accurately identified through predictive analytics.	227	126	5	5	3.58	0.60	VHE
Grand mean						3.26	0.45	HE

Data presented in table 3 above shows the mean scores on the extent predictive analytics, enhance staff development in public universities in Rivers State. The data shows that the respondents agreed to a high extent that staff development resources are allocated more efficiently using predictive insights, predictive analytics helps anticipate changes in required staff skills, predictive analytics enhances the ability to plan for succession in key roles, predictive analytics helps identify which staff are likely to benefit most from specific training and staff attrition risks are more accurately identified through predictive analytics as seen in items

11,12, 13, 14 and 15 which have mean values above the criterion mean of 2.50. The grand mean of 3.26 indicates that the answer to research question three is that, to a high extent, predictive analysis, enhance staff development in public universities in Rivers State.

Test of Hypotheses

1: There is no significant difference between the mean ratings of academic and non-teaching staff on the extent learning analytics, enhance staff development in public universities in Rivers State?

Table 4: t-test summary showing significant difference in the mean ratings of academic and non-teaching staff on the extent learning analytics, enhance staff development in public universities in Rivers State

Category	N	Mean	SD	Df	t-cal	p-value	Decision
Academic Staff	205	3.49	0.46	362	0.33	0.67*	H ₀₁ Accepted
Non-Teaching Staff	159	3.82	0.49				

*Not Significant; $p > 0.05$

Table 4 showed the t-test summary of the significant difference in the mean ratings of academic and non-teaching staff on the extent learning analytics, enhance staff development in public universities in Rivers State. The result of the study showed that there was no significant difference at ($t\text{-cal} = 0.33$, $df = 362$, $p = 0.67$) as the $p > 0.05$. Therefore, the null hypothesis which state that there is no significant difference in the mean ratings of academic and

non-teaching staff on the extent learning analytics, enhance staff development in public universities in Rivers State was accepted.

2: There is no significant difference between the mean ratings of academic and non-teaching staff on the extent performance analytics, enhance staff development in public universities in Rivers State?

Table 5: t-test summary showing significant difference in the mean ratings of principals and teachers on the extent performance analytics, enhance staff development in public universities in Rivers State

Category	N	Mean	SD	Df	t-cal	p-value	Decision
Academic Staff	205	3.51	0.45	362	0.35	0.61*	H ₀₂ Accepted

Non-Teaching Staff	159	3.32	0.42
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*Not Significant; $p > 0.05$

Table 5 showed the t-test summary of the significant difference in the mean ratings of academic and non-teaching staff on the extent performance analytics, enhance staff development in public universities in Rivers State. The result of the study showed that there was no significant difference at ($t\text{-cal} = 0.35$, $df = 362$, $p = 0.61$) as the $p > 0.05$. Therefore, the null hypothesis which state that there is no significant difference in the mean ratings of academic and

non-teaching staff on the extent performance analytics, enhance staff development in public universities in Rivers State was accepted.

3: There is no significant difference between the mean ratings of academic and non-teaching staff on the extent predictive analytics, enhance staff development in public universities in Rivers State?

Table 6: t-test summary showing significant difference in the mean ratings of academic and non-teaching staff on the extent predictive analytics, enhance staff development in public universities in Rivers State.

Category	N	Mean	SD	df	t-cal	p-value	Decision
Academic Staff	205	3.11	0.65	362	0.47	0.71*	H_{03} Accepted
Non-Teaching Staff	159	3.22	0.62				

*Not Significant; $p > 0.05$

Table 6 showed the t-test summary of the significant difference in the mean ratings of academic and non-teaching staff on the extent predictive analytics, enhance staff development in public universities in Rivers State. The result of the study showed that there was no significant difference at ($t\text{-cal} = 0.47$, $df = 362$, $p = 0.71$) as the $p > 0.05$. Therefore, the null hypothesis which state that there is no significant difference in the mean ratings of academic and non-teaching staff on the extent predictive analytics, enhance staff development in public universities in Rivers State was accepted.

Discussion of Findings

The heading dealt with the discussion of findings based on the objectives of the study

Extent Learning Analytics, Enhance Staff Development in Public Universities in Rivers State

Data presented in table 1 above shows the mean scores on

the extent learning analytics, enhance staff development in public universities in Rivers State. The data shows that the respondents agreed to a high extent that Learning analytics helps identify skills gaps among staff, learning analytics improves the quality of staff development programmes, learning analytics helps track staff progress in development activities, the use of learning analytics leads to more targeted staff training and staff training needs are better understood through learning analytics as seen in items 1, 2, 3, 4 and 5 which have mean values above the criterion mean of 2.50. The grand mean of 3.49 indicates that the answer to research question one is that, to a high extent, learning analytics, enhance staff development in public universities in Rivers State. The above finding is inconsonant with the findings of Onyango and Wanyoike (2014) which revealed that learning analytics improves the quality of staff development programmes in universities where staff training needs are better understood through learning analytics. Again, the findings also agreed with Elem (2019) who found that the use of learning analytics leads to more targeted staff training and helps identify skills gaps among

staff in order to carry out these trainings to their needs. Again, this is corroborated by a study by Ifenthaler and Widanapathirana (2019), which demonstrated that data-driven approaches improve the relevance and quality of professional development by aligning training with actual needs.

Extent Performance Analytics, Enhance Staff Development in Public Universities in Rivers State

Data presented in table 2 above shows the mean scores on the extent performance analytics, enhance staff development in public universities in Rivers State. The data shows that the respondents agreed to a high extent that performance analytics enables more objective staff evaluations, performance analytics accurately identifies areas for staff improvement, the effectiveness of staff training is more measurable through performance analytics, staff weaknesses are more quickly identified using performance analytics and performance analytics helps tailor development programmes to individual staff needs as seen in items 6, 7, 8, 9 and 10 which have mean values above the criterion mean of 2.50. The grand mean of 3.46 indicates that the answer to research question two is that, to a high extent, performance, enhance staff development in public universities in Rivers State. The above findings are in agreement with the work of Grande, et al. (2015) which revealed that performance analytics enables more objective staff evaluations to find out necessary conditions to address staff needs. The study was also inconsonant with the work of Murithi (2016) which shows a significant difference in the mean ratings of academic staff where the effectiveness of staff training is more measurable through performance analytics and performance analytics helps tailor development programmes to the needs of the individual staff.

Extent Predictive Analytics, Enhance Staff Development in Public Universities in Rivers State

Data presented in table 3 above shows the mean scores on the extent predictive analytics, enhance staff development in public universities in Rivers State. The data shows that the respondents agreed to a high extent that staff development

resources are allocated more efficiently using predictive insights, predictive analytics helps anticipate changes in required staff skills, predictive analytics enhances the ability to plan for succession in key roles, predictive analytics helps identify which staff are likely to benefit most from specific training and staff attrition risks are more accurately identified through predictive analytics as seen in items 11,12, 13, 14 and 15 which have mean values above the criterion mean of 2.50. The grand mean of 3.26 indicates that the answer to research question three is that, to a high extent, predictive analysis, enhance staff development in public universities in Rivers State. This finding aligns with the research by van Barneveld, Arnold, and Campbell (2020), which emphasizes how predictive analytics can enhance decision-making by identifying areas where resources can be most effectively utilized.. According to Davenport and Bean (2021), predictive models can forecast skill demands, allowing institutions to proactively address skill gaps. Studies by Rothwell (2020) indicate that predictive analytics can identify potential leaders and plan for their development, ensuring a seamless transition in key roles. This is supported by the findings of Ifenthaler and Schumacher (2020), who found that predictive models can tailor training programmes to individual needs, thereby enhancing their effectiveness.

Conclusion/Recommendations

The study examined data-driven approaches in enhancing staff development in public universities in Rivers State. The various approaches were identified such as learning analytics, performance analytics and predictive analytics approaches as it enhances staff development in public schools in Rivers State. Each of the analytics contributes to staff development in unique ways, from identifying skills gaps and improving training quality to enabling more objective evaluations and anticipating future skill needs. Furthermore, the lack of significant differences between academic and non-teaching staff responses suggests that these analytics are equally beneficial across different staff categories. This emphasizes the broad usage of analytics in higher education staff development. Overall, the findings strongly support the integration of these analytics into staff development strategies in public universities, highlighting their potential to create more targeted, efficient, and

effective professional development programmes.

Based on the identified findings, the following recommendations were highlighted:

1. University administrators should invest in implementing robust learning analytics systems to help identify skills gaps, track academic and non-teaching staff progress, and improve the quality and targeting of training programmes. This could involve adopting learning management systems with built-in analytics capabilities.
2. University administrators should utilize Performance analytics tools to enable more objective staff evaluations, to quickly identify areas for improvement, and tailor development programs to individual staff needs.
3. University administrators should explore predictive analytics capabilities to anticipate future skill requirements, plan for succession in key roles, and allocate staff development resources more efficiently.

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