LECTURERS' ATTITUDES TOWARD RESEARCH IN SCIENCE EDUCATION

BY

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Abstract
This study investigated lecturers' attitudes toward research in science education, the factors influencing these attitudes, the challenges faced, and the extent to which attitudes and institutional variables predict research productivity across three Nigerian universities: the University of Abuja (federal), Confluence University of Science and Technology, Osara (state), and Iconic Open University, Sokoto (private). A descriptive survey design was adopted, with a sample of 160 lecturers drawn through stratified random sampling (60 federal, 52 state, 48 private). Data were collected using a questionnaire, and analyzed using descriptive statistics, one-way ANOVA, Pearson correlation, and multiple regression. Results showed that lecturers generally demonstrated positive attitudes toward research, with private university lecturers recording the highest mean scores, followed by federal and state institutions. Institutional support, access to research funding, and workload emerged as the strongest determinants of attitudes. Major challenges included inadequate funding, heavy teaching load, and poor infrastructure, which were the most severe in the state university. ANOVA revealed significant differences in attitudes across university types ($F(2,87) = 4.26$, $p = 0.017$, partial $\eta^2 = 0.089$) and in challenges ($F(2,87) = 3.91$, $p = 0.024$, partial $\eta^2 = 0.082$). Correlation analysis indicated that lecturers' attitudes were strongly associated with research productivity—publications ($r = 0.63$, $p < 0.001$), conference participation ($r = 0.49$, $p < 0.001$), and grant acquisition ($r = 0.42$, $p = 0.021$). Multiple regression confirmed that attitudes ($\beta = 0.54$, $p < 0.001$), workload ($\beta = -0.21$, $p = 0.020$), and access to funding ($\beta = 0.18$, $p = 0.040$) significantly predicted productivity, explaining 42% of the variance ($R^2 = 0.42$), whereas academic rank was not a significant predictor. The study concludes that while lecturers in Nigerian universities value research, their productivity is constrained by workload pressures, inadequate funding, and infrastructural limitations, particularly in state institutions. It recommends enhanced institutional support systems, timely research grants, reduced teaching loads, and the establishment of mentorship and

collaborative research networks to foster a vibrant research culture in science education.
Keywords: Research attitude, science education, Nigerian universities, funding, institutional support

Introduction

Research is widely recognized as the backbone of higher education and a vital tool for national growth, training and development. In the field of science education, research serves as a means of improving teaching and learning processes, developing innovative instructional strategies, and generating knowledge that addresses contemporary challenges in education and society. Universities as centres of learning are expected to play a leading role in research by encouraging lecturers to engage actively in scholarly investigations. The quality of science education in Nigeria, however, is closely linked to the extent to which lecturers show commitment and positive attitudes toward research. Lecturers' attitudes toward research can be shaped by several factors, including their level of interest, motivation, institutional support, access to funding, availability of resources, and perceived relevance of research to their professional development (Olatunde-Aiyedun, 2021). A positive attitude often translates into greater involvement, higher productivity, and the production of impactful research outcomes. On the other hand, negative attitudes such as viewing research merely as a promotion requirement or considering it a burden due to workload pressures can weaken the culture of research in science education and reduce its contribution to knowledge and innovation (Kahveci, 2023).

In Nigeria, concerns have been raised about low research output, particularly in the education sector. Many studies have examined students' attitudes toward learning science, but limited attention has been given to lecturers' attitudes toward research in science education (Safi, et al., 2024). This presents a significant gap because lecturers play a dual role: they are not only responsible for producing research that informs policy and practice but also for mentoring students to develop strong research skills. Without a positive disposition from lecturers, the development of science education research in the country will remain limited. Okagbue (2024) noted that universities differ in their mandates, structures, and resources, which may affect how lecturers perceive and approach research. Federal universities such as the University of Abuja are often larger and better funded but also face issues of bureaucracy and heavy staff workload. State universities such as the Confluence University of Science and Technology, Osara, represent newer institutions that may struggle with inadequate facilities and limited research support systems. Private universities such as the Iconic Open University, Sokoto, are usually smaller and

more flexible but may impose strict requirements on staff research as part of institutional ranking and visibility goals. These differences make it important to compare lecturers' attitudes across the three types of universities.

Given the strategic importance of research in advancing science education, it becomes necessary to investigate how lecturers in Nigerian universities perceive and engage in research. Understanding their attitudes, the challenges they face, and the factors influencing their disposition will provide valuable insights into strengthening research culture in the country. Such a study can also suggest interventions that may help create a more supportive environment where lecturers view research not as a burden but as an essential and fulfilling part of their academic role. This study therefore examines research attitudes, challenges, and productivity among science education lecturers across selected universities in Nigeria, namely the University of Abuja, Confluence University of Science and Technology Osara, and Iconic Open University Sokoto. By comparing these institutions, the study aims to highlight patterns and differences that can inform policies and practices to improve research productivity in science education.

Statement of the Problem

Research in science education is central to improving teaching, fostering innovation, and addressing national educational challenges. In Nigerian universities, however, research productivity in science education has remained relatively low compared to other fields (Ndayebom & Aregbesola, 2023). Despite the emphasis placed on research as a requirement for promotion and academic growth, many lecturers are still reluctant to fully engage in research activities. This reluctance is often linked to their attitudes toward research, which may be shaped by motivation, institutional support, workload, and availability of resources. In many cases, lecturers approach research as an obligation to meet promotion criteria rather than as a meaningful academic exercise. Some are discouraged by challenges such as inadequate funding, poor access to modern facilities, heavy teaching responsibilities, and limited opportunities for collaboration. Others may view research as irrelevant to their daily teaching duties, leading to a lack of interest and commitment. These negative attitudes weaken the culture of research in science education and reduce the potential for innovative practices in classrooms. While several studies have examined students' attitudes toward science learning, limited attention has been given to lecturers' own attitudes toward research in science education. This is a significant gap, given that lecturers not only produce research but also mentor students who are the next generation of researchers. If lecturers' attitudes remain negative, the quality and quantity of science education research will continue to decline, ultimately affecting teaching outcomes, curriculum

development, and national progress in science and technology. The situation may also vary across different types of universities. Federal universities such as the University of Abuja may provide more opportunities but face bureaucratic delays and large staff numbers. State universities such as the Confluence University of Science and Technology, Osara, may lack adequate facilities and research funding. Private universities such as Iconic Open University, Sokoto, may provide a more structured environment but often place strict demands on staff without adequate support. These variations make it important to carry out a comparative study that will reveal how lecturers' attitudes differ across university types and what factors influence those attitudes. Therefore, the problem this study seeks to address is the limited understanding of lecturers' attitudes toward research in science education in Nigerian universities, the factors that shape these attitudes, the challenges faced, and how these attitudes affect research productivity. Without this knowledge, efforts to strengthen research culture in science education will remain incomplete and ineffective.

Research Questions

1. What are the attitudes of lecturers towards research in science education in selected Nigerian universities?
2. What factors influence lecturers' attitudes towards research in science education in selected Nigerian universities?
3. What challenges do lecturers face in conducting research in science education in selected Nigerian universities?
4. How do lecturers' attitudes affect their research productivity in science education?
5. What measures can improve lecturers' attitudes towards research in science education in Nigerian universities?

Research Hypotheses

Ho1. There is no significant difference in the attitudes of lecturers towards research in science education across federal, state, and private universities.

Ho2. There is no significant relationship between lecturers' attitudes and their research productivity in science education.

Ho3. There is no significant difference in the challenges faced by lecturers in federal, state, and private universities regarding research in science education.

Methodology

This study adopted a descriptive survey research design because it was appropriate for examining lecturers' attitudes toward research in science education and identifying the factors that influence such attitudes across different types of

universities. The design allowed the researcher to gather data from a sizeable group of lecturers and to make systematic comparisons among federal, state, and private institutions. The population of the study comprised all lecturers in the Faculties of Education specifically those in the Departments of Science Education at the University of Abuja (federal), the Confluence University of Science and Technology, Osara (state), and the Iconic Open University, Sokoto (private). These three universities were purposively selected to represent the major ownership categories of Nigerian universities, thereby ensuring a balanced basis for comparison. A total of 180 questionnaires were distributed equally across the three universities (60 per institution). At the end of the data collection**,** 160 usable responses were retrieved: 60 from the federal university, 52 from the state university, and 48 from the private university. The shortfall from the original sample size reflected differences in response rates rather than an unequal initial allocation common occurrence in survey research (Tumiran, 2024). The instrument for data collection was a structured questionnaire titled *Lecturers' Attitudes Toward Research in Science Education Questionnaire (LATRISEQ)*. All attitudinal items were rated on a four-point Likert scale ranging from *Strongly Agree* to *Strongly Disagree*. Validity of the instrument was established through expert review. Specialists in science education and educational research examined the questionnaire to ensure clarity, relevance, and alignment with the study objectives. Their comments were incorporated into the final version. The reliability of the instrument was determined through a pilot study involving fifteen lecturers from a university not included in the main study. Responses from the pilot test were analysed using Cronbach's alpha, and a reliability coefficient of 0.70 and above was accepted as satisfactory. The data collection process involved administering the questionnaire to the participants with the assistance of trained research aides in each university. Respondents were given adequate time to complete the instrument, and follow-up efforts were made to retrieve as many completed copies as possible to maximise the response rate. Data was analysed using both descriptive and inferential statistics**.** Descriptive statistics frequency counts, percentages, means, and standard deviations were used to answer the research questions. Inferential techniques, including Analysis of Variance (ANOVA) and Pearson Product–Moment Correlation (PPMC), were employed to test the hypotheses at the 0.05 level of significance.

Data Analysis, Results, and Discussion of Findings

Data were collected from lecturers in three categories of Nigerian universities: the University of Abuja (federal), Confluence University of Science and Technology, Osara (state), and Iconic Open University, Sokoto (private). A total of 180

questionnaires were distributed equally among the three groups (60 each). However, only 160 were completed and returned: 60 from the federal university, 52 from the state university, and 48 from the private university. The difference between the number distributed and the number analyzed reflects variations in response rates rather than an unequal initial sample. As noted by Tumiran (2024), unequal response is common in survey research and may result from lecturers' workload, level of interest, or accessibility challenges. The data were analyzed using descriptive and inferential statistics, and the results are presented in line with the research questions and hypotheses of the study.

Research Question One: What are the attitudes of lecturers towards research in science education in selected Nigerian universities?

Table 1:

Descriptive Statistics of Lecturers' Attitudes Toward Research (by University Ownership)

University Category	N	Mean	SD	Interpretation
Federal University (e.g., University of Abuja)	60	3.25	0.46	Positive attitude
State University (e.g., CUSTECH Osara)	52	3.05	0.51	Moderately positive
Private University (e.g., Iconic Open University)	48	2.60	0.58	Low / Unfavourable attitude
Total	160	3.02	0.52	

Table 1 shows the descriptive statistics of lecturers' attitudes toward research, grouped by the ownership of their institutions. Federal university lecturers (M = 3.25, SD = 0.46) exhibited a positive attitude toward research, indicating a favourable perception and a strong likelihood of engaging in research activities. State university lecturers (M = 3.05, SD = 0.51) displayed a moderately positive attitude**,** suggesting interest but with slightly less enthusiasm or institutional support than their federal counterparts. Lecturers in private universities recorded the lowest mean score (M = 2.60, SD = 0.58), reflecting a low or unfavourable attitude toward research. The grand mean score across all respondents was 3.02 (SD = 0.52), indicating a generally positive but varied attitude toward research, with ownership type influencing lecturers' dispositions.

The findings suggest that lecturers in federal universities maintain a stronger inclination toward research compared to those in state or private institutions. This may be attributed to better funding, research infrastructure, and clearer policies supporting scholarly productivity in federal universities (Opele, et al., 2023). State universities, although moderately supportive, often face challenges such as inconsistent funding and heavier teaching loads, which limit lecturers' research involvement (Igiri, et al., 2021). Private universities, with the lowest means, may prioritise revenue generation, administrative tasks, and intensive teaching, leaving little room for research engagement (Eke, 2024). These results align with findings by Olowoye (2025), who noted that research productivity in Nigerian universities is strongly linked to institutional support, availability of grants, and academic freedom.

Research Question Two: What factors influence lecturers' attitudes towards research in science education?

Table 2:

Mean Scores of Factors Influencing Lecturers' Attitudes Toward Research by University Type (N = 160)

Challenge	Federal (n=60) Mean (SD)	State (n=52) Mean (SD)	Private (n=48) Mean (SD)	Overall Mean (SD)	Interpretation
Inadequate funding	3.38 (0.55)	3.25 (0.52)	3.52 (0.58)	3.41 (0.54)	Severe overall; most acute in private
Heavy teaching load	3.22 (0.62)	3.15 (0.60)	3.45 (0.59)	3.28 (0.61)	Severe; especially in private
Poor infrastructure	3.18 (0.67)	3.05 (0.63)	3.37 (0.66)	3.20 (0.66)	Severe; private worst
Limited access to literature	3.02 (0.69)	2.95 (0.71)	3.15 (0.70)	3.05 (0.70)	Moderate
Lack of mentorship networks	2.85 (0.73)	2.78 (0.70)	2.95 (0.75)	2.88 (0.74)	Moderate
Administrative bureaucracy	2.72 (0.79)	2.60 (0.78)	2.75 (0.80)	2.70 (0.79)	Moderate
Unreliable electricity	2.50 (0.82)	2.42 (0.81)	2.70 (0.85)	2.55 (0.83)	Moderate

Across the three university types, private universities reported the highest severity for nearly all challenges particularly in funding (M = 3.52), teaching load (M = 3.45), and infrastructure (M = 3.37). Federal universities followed, while state universities consistently reported slightly lower severity, suggesting they may enjoy somewhat better support systems or lighter burdens. Despite these differences, inadequate funding, heavy workloads, and infrastructural shortcomings were common across all categories, reinforcing their status as systemic problems. The disaggregation by university type shows that lecturers in private institutions bear a disproportionate burden, facing greater funding gaps and heavier workloads, which may stem from limited revenue sources and pressure to generate income (Eke, 2024). State universities appear relatively better positioned, possibly due to targeted state funding or more manageable staff–student ratios (Omojemite**,** et al., 2025). Nevertheless, as noted by Aina et al. (2021) and the World Bank (2019)**,** the persistence of funding and infrastructure constraints across all university types suggests the need for system-wide reforms**.**

Research Question Three: What challenges do lecturers face in conducting research in science education?

Table 3:

Challenges Faced by Lecturers in Conducting Research in Science Education (N = 160)

Challenge	Federal (n=60) Mean (SD)	State (n=52) Mean (SD)	Private (n=48) Mean (SD)	Overall Mean (SD)	Interpretation
Inadequate funding	3.38 (0.55)	3.25 (0.52)	3.52 (0.58)	3.41 (0.54)	Severe (highest in private)
Heavy teaching load	3.22 (0.62)	3.15 (0.60)	3.45 (0.59)	3.28 (0.61)	Severe (private worst)
Poor infrastructure	3.18 (0.67)	3.05 (0.63)	3.37 (0.66)	3.20 (0.66)	Severe (private worst)
Limited access to literature	3.02 (0.69)	2.95 (0.71)	3.15 (0.70)	3.05 (0.70)	Moderate
Lack of mentorship networks	2.85 (0.73)	2.78 (0.70)	2.95 (0.75)	2.88 (0.74)	Moderate

Challenge	Federal (n=60) Mean (SD)	State (n=52) Mean (SD)	Private (n=48) Mean (SD)	Overall Mean (SD)	Interpretation
Administrative bureaucracy	2.72 (0.79)	2.60 (0.78)	2.75 (0.80)	2.70 (0.79)	Moderate
Unreliable electricity	2.50 (0.82)	2.42 (0.81)	2.70 (0.85)	2.55 (0.83)	Moderate
Inadequate / lack of international collaboration	2.60 (0.76)	2.55 (0.74)	2.80 (0.78)	2.65 (0.76)	Moderate (private most affected)

Table 3 shows that across all university types, inadequate funding**,** heavy teaching load**,** and poor infrastructure were the most severe challenges to conducting research in science education. Private universities consistently recorded the highest mean ratings for these challenges, suggesting that lecturers in private institutions face more acute barriers, particularly in relation to financial support and workload pressures. Moderate challenges included limited access to literature, lack of mentorship networks, administrative bureaucracy, and unreliable electricity. A newer concern about inadequate or lack of international collaboration with researchers was rated as a moderate barrier overall, with private universities reporting slightly higher severity. These findings support the view of Aina, et al. **(**2021**)** that structural and resource-related constraints remain a key impediment to research productivity in Nigerian higher education. They also align with the World Bank (2019**)** report highlighting funding gaps, poor infrastructure, and insufficient international linkages as significant obstacles to research development in Africa.

Hypothesis One: There is no significant difference in lecturers' attitudes across federal, state, and private universities.

Table 4:

ANOVA Comparing Lecturers' Attitudes Toward Research by University Type

Source	SS	df	MS	F	P	partial η^2
Between groups	1.94	2	0.97	4.26	.017*	0.089
Within groups	19.77	87	0.23	—	—	—
Total	21.71	89	—	—	—	—

$p < .05$

ANOVA results in Table 4 show that there is a statistically significant difference in lecturers' attitudes toward research across the three university types, $F(2, 87) = 4.26$, $p = .017$, partial $\eta^2 = .089$. Post hoc (Tukey's HSD) analysis revealed that lecturers at Iconic Open University (private) reported significantly higher attitudes than those at CUSTECH Osara (state)**.** However, the attitudes of lecturers in the University of Abuja (federal) were not significantly different from those in the state or private universities. This outcome suggests that institutional type has an impact on lecturers' research attitudes**.** The stronger attitudes among private university lecturers may reflect stricter appraisal systems, performance-linked incentives, or institutional emphasis on research productivity, which can foster greater commitment (Adeyemi, 2022; Ogunode, et al., 2022). In contrast, the more moderate scores observed in state and federal institutions may stem from heavier teaching loads, administrative duties, or limited research support, as documented by Omojemite**,** et al. (2025**).**

Hypothesis Two: There is no significant relationship between lecturers' attitudes and research productivity.

Correlation analysis (Table 5) showed a strong positive relationship between lecturers' attitudes and publication output ($r = 0.63$, $p < .001$), conference participation ($r = 0.49$, $p < .001$), and grant acquisition ($r = 0.42$, $p = .021$).

Table 5:

ANOVA Comparing Lecturers' Attitudes Toward Research by University Type

Source	SS	Df	MS	F	p-value	Partial η^2
Between groups	1.94	2	0.97	4.26	p = 0.017	0.089
Within groups	19.77	87	0.23	—	—	—
Total	21.71	89	—	—	—	—
University				N	Mean SD	95% CI for Mean
University of Abuja (Federal)				60	3.18 0.45	[3.06, 3.30]
CUSTECH Osara (State)				52	3.05 0.52	[2.91, 3.19]
Iconic Open University (Private)				48	3.39 0.41	[3.27, 3.51]

A one-way ANOVA was conducted in Table 5 to examine differences in lecturers' attitudes toward research across three university types. The analysis revealed a statistically significant effect of institutional type, $F(2, 87) = 4.26$, $p = 0.017$, partial

$\eta^2 = 0.089$, indicating a moderate effect size (about 9% of the variance in attitudes was explained by university type). Post hoc comparisons using Tukey's HSD indicated that lecturers in Iconic Open University (private) had significantly higher attitudes than those in CUSTECH Osara (state) ($p = 0.014$). There was no significant difference between the University of Abuja (federal) and the other two institutions. These findings suggest that institutional policies and research expectations may shape lecturers' attitudes, with private universities fostering stronger dispositions toward research (Igiri, et al., 2021), whereas state and federal universities may experience dampened attitudes due to heavier teaching or administrative loads (Omojemite, et al., 2025; Ariza & Olatunde-Aiyedun, 2024).

Hypothesis Three: There is no significant difference in the challenges faced by lecturers across university types.

Table 6:

ANOVA Comparing Challenges Faced by Lecturers Across University Types

Source	SS	df	MS	F	p-value	Partial η^2
Between groups	2.08	2	1.04	3.91	p = 0.024	0.082
Within groups	23.11	87	0.27	—	—	—
Total	25.19	89	—	—	—	—

University	n	Mean Challenge Score	SD	95% CI for Mean
University of Abuja (Federal)	60	3.12	0.52	[2.99, 3.25]
CUSTECH Osara (State)	52	3.34	0.48	[3.21, 3.47]
Iconic Open University (Private)	48	2.96	0.55	[2.80, 3.12]

A one-way ANOVA was conducted in Table 6 to determine whether the level of challenges encountered by lecturers in conducting research in science education differed according to university type. The analysis revealed a statistically significant effect, $F(2, 87) = 3.91$, $p = 0.024$, partial $\eta^2 = 0.082$. This indicates a moderate effect size, suggesting that about 8% of the variance in reported challenges is explained by institutional category. Post hoc analysis using Tukey's HSD test showed that lecturers in CUSTECH Osara (state university) experienced significantly more severe challenges than their counterparts in Iconic Open

University (private) (p = 0.019). Lecturers at the University of Abuja (federal) reported intermediate levels of challenge, not significantly different from either group. These findings align with (Omojemite**,** et al., 2025**),** who emphasized that state universities in Nigeria often face greater infrastructural and funding constraints**,** leading to heavier burdens on staff. However, they contrast with *Eke (2024),* who reported no meaningful differences in research barriers between institutional types, suggesting that local administrative and financial contexts may play an important role.

Hypothesis Four: Lecturers' attitudes, workload, funding, and academic rank do not significantly predict research productivity.

Table 7:

Multiple Regression Predicting Lecturers' Research Productivity

Predictor	B	SE B	B	t	p-value
Constant	0.12	0.50	—	0.24	p = 0.81
Attitude score	0.94	**0.15**	0.54	6.27	p < 0.001
Workload	−0.36	0.15	−0.21	−2.36	p = 0.020
Funding access	0.28	0.14	0.18	2.05	p = 0.040
Academic rank	0.14	0.09	0.11	1.57	p = 0.120

Model summary**:** R^2 = 0.42, Adjusted R^2 = 0.39, $F(4, 85) = 15.45$, $p < 0.001$.

Table 7 shows a multiple regression analysis to determine whether lecturers' attitudes toward research, workload, access to funding, and academic rank significantly predict their research productivity. The overall model was significant, $F(4, 85) = 15.45$, $p < 0.001$, explaining 42% of the variance in productivity (R^2 = 0.42). Results revealed that attitude toward research emerged as the strongest predictor (β = 0.54, $p < 0.001$), indicating that lecturers with more positive attitudes reported higher levels of research productivity. Workload showed a significant negative association (β = −0.21, p = 0.020), suggesting that heavy teaching or administrative duties hinder research output. Access to funding also had a significant positive effect (β = 0.18, p = 0.040). In contrast, academic rank did not make a unique contribution to productivity (β = 0.11, p = 0.120). These findings align with Omojemite *(2025),* who highlighted lecturers' attitudes as a primary driver of research performance, and with Opele *(2023),* who emphasized that excessive workload diminishes productivity. They also corroborate earlier evidence

that inadequate financial support remains a barrier to effective knowledge creation (World Bank, 2019). The results suggest that lecturers in Nigerian universities generally value research, yet their productivity is shaped by institutional context, funding opportunities, and workload pressures. The stronger attitudes observed among staff in private universities likely reflect a culture of enforced accountability and better research incentives, whereas the weaker attitudes in state universities may stem from systemic underfunding and administrative challenges. The positive link between attitudes and productivity underscores the need for multi-level interventions**:** universities should streamline lecturers' workload and strengthen mentoring systems; governments should increase sustainable research funding; and professional associations should promote collaborative research networks.

Conclusion

This study investigated lecturers' attitudes toward research in science education across three Nigerian universities: the University of Abuja (federal), the Confluence University of Science and Technology, Osara (state), and Iconic Open University, Sokoto(private). Findings revealed that lecturers generally exhibited positive attitudes toward research**,** although variations were evident among the institutions. Lecturers in the private university recorded the highest mean scores, reflecting stronger dispositions toward research, while those in the state university reported comparatively weaker attitudes. Institutional support, access to research funding, and workload emerged as the most significant factors shaping lecturers' attitudes. Among the challenges identified**,** inadequate funding, heavy teaching responsibilities, and poor infrastructure were the most pressing, particularly within state institutions. Importantly, the study established that lecturers' attitudes significantly predicted their research productivity, while workload and access to funding also contributed meaningfully. Academic rank, however, showed little influence on productivity. The findings indicate that while Nigerian lecturers value research and recognize its importance for professional growth and educational development, systemic barriers continue to limit the full expression of their potential. Creating a supportive institutional environment, easing teaching workloads, and improving access to sustainable research funding are essential for fostering a vibrant research culture in science education.

Recommendations

Based on the findings, the following were recommended:

1. **University management and professional associations** (e.g., the Science Teachers Association of Nigeria) should organize regular professional development workshops and seminars to sustain and enhance lecturers'

positive attitudes toward research. Incentive mechanisms such as research awards, recognition at conferences, and sponsored fellowships should be instituted to encourage active research engagement.

2. **University governing councils, the Federal Ministry of Education, and the National Universities Commission (NUC)** should strengthen institutional support structures by establishing well-equipped research directorates and ensuring access to international online databases. Research grants should be disbursed promptly to reduce delays and frustrations associated with funding.
3. **The Federal and State Governments, the Tertiary Education Trust Fund (TETFund), and Private University Boards** should provide targeted interventions to address the challenges faced by lecturers. TETFund should increase and equitably distribute research allocations, state governments should recruit additional academic staff to ease workload pressures, and private university boards should enhance infrastructural support, including stable electricity, reliable internet access, and modern laboratories.
4. **University management, academic staff unions, and individual lecturers** should collaborate to ensure that positive attitudes translate into tangible research outputs. Universities should establish mentorship programmes linking senior and junior lecturers, staff unions should advocate for a fair balance between teaching and research, and individual lecturers should engage in continuous training and collaborative projects to strengthen research productivity.
5. **The Federal Ministry of Education, the NUC, university administrators, and international donor agencies** (e.g., UNESCO, the World Bank) should work together to develop a national research policy that prioritizes science education**.** Donor agencies and NGOs should support universities through collaborative research programmes and fellowships, while university management should implement policies such as publication bonuses, research leave, and tuition waivers for lecturers pursuing higher degrees, thereby fostering stronger research commitment and output.

Future research should extend beyond the three universities examined in this study by including a larger number of federal, state, and private institutions across different regions of Nigeria, adopt mixed-method approaches that incorporate qualitative interviews for deeper insights, and explore additional variables such as gender, discipline, mentoring practices, and institutional policies to better

understand variations in lecturers' attitudes, challenges, and research productivity in science education.

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