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Chemistry Lecturers' Perception and Acceptance of ChatGPT for Instructional Practices in Colleges of Education, North-West Nigeria: A Gender-Based Comparative Analysis

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Abstract

Generative artificial intelligence tools such as ChatGPT are transforming higher education, but evidence on Chemistry lecturers' perception and acceptance of these tools in Colleges of Education in North-West Nigeria remains limited. This study examined lecturers' perception of ChatGPT, their acceptance of its integration into teaching, and whether these variables differed by gender. A quantitative descriptive cross-sectional survey design was adopted. The study involved 139 Chemistry lecturers from twelve public Colleges of Education. Data were collected using an expert-validated questionnaire with a Cronbach's alpha reliability coefficient of .859. Mean, standard deviation, One-sample *t*-test and Mann-Whitney U test statistics were used for data analysis. Results showed that lecturers had a significantly positive perception of ChatGPT (M = 4.10) and a high level of acceptance of its integration into teaching (M = 4.19). There were no statistically significant gender differences in perception (p = .437) or acceptance (p = .876). The study concludes that Chemistry lecturers are receptive to integrating ChatGPT into teaching irrespective of gender. It recommends continuous professional development, improved institutional infrastructure, and equitable access to AI training to strengthen the effective integration of ChatGPT into chemistry education.

Keywords: ChatGPT, chemistry lecturers, perception, acceptance, gender, colleges of education

1 Introduction

Technological advancement has continually reshaped teaching and learning in higher education, and artificial intelligence (AI) now represents one of the most consequential of these shifts (Suryanti et al. 2024). Generative AI tools such as ChatGPT, built on large language models, are increasingly used to personalise learning, generate instructional materials and support student engagement across disciplines. Within teacher-training institutions responsible for preparing the next generation of science educators, the manner in which lecturers perceive and accept such tools has direct implications for how, and whether, these technologies are eventually transferred into classroom practice. Chemistry occupies a central place in science education because of its applications in medicine, agriculture, industry and technology, yet it remains one of the most conceptually demanding subjects to teach and learn (UNESCO, 2023). In Nigeria, chemistry instruction at the Nigeria Certificate in Education (NCE) level is further constrained by inadequate laboratories, large class sizes and limited use of innovative pedagogy (Onu et al. 2024). ChatGPT, since its public release in 2022, has been credited with the capacity to simplify abstract concepts, generate step-by-step explanations and support inquiry beyond the classroom (Sun & Li, 2024), positioning it as a plausible complement to conventional chemistry instruction in resource-constrained settings. Its pedagogical value, however, is realised only to the extent that lecturers view it favourably and are willing to adopt it; perception and acceptance are therefore the two variables that most immediately determine whether such potential is translated into practice.

The integration of AI-driven technologies into teaching is further supported by established learning theories. Constructivist learning theory, associated with Vygotsky (1978), holds that learners actively construct knowledge through interaction and guided support; ChatGPT can be understood as a facilitative agent within this process, engaging lecturers and, by extension, students in dialogic explanation that scaffolds understanding of difficult chemistry topics such as bonding, stoichiometry and equilibrium. This theoretical grounding reinforces the practical rationale for examining lecturers' dispositions toward the tool: if ChatGPT is to function as a genuine scaffold for constructivist chemistry pedagogy, lecturers themselves must

first perceive it as trustworthy and be willing to incorporate it into their instructional repertoire, making their perception and acceptance a necessary precondition for any downstream pedagogical benefit.

Despite growing global interest in generative AI for education, empirical evidence on how practising Chemistry lecturers in Nigerian Colleges of Education perceive and accept ChatGPT remains scarce, and even scarcer is evidence on whether these dispositions differ between male and female lecturers. Prior Nigerian studies have tended to examine AI adoption among secondary school teachers or university lecturers in disciplines other than chemistry (Ojo, 2024; Sunday, Bassey, Essien, Udoh, & Paul, 2025), leaving a contextual gap regarding Chemistry lecturers specifically engaged in teacher preparation. Understanding whether gender shapes these dispositions is equally important: where the population of Chemistry lecturers is heavily male-dominated, as is common in Nigerian Colleges of Education, unexamined gender disparities in perception or acceptance could translate into uneven benefits from any subsequent AI-integration policy or training intervention. This study therefore sought to (a) assess Chemistry lecturers' perception of ChatGPT as a tool for enhancing instructional practices, (b) examine the level at which Chemistry lecturers accept the integration of ChatGPT into instructional practices, and (c) compare male and female Chemistry lecturers' perception and acceptance of ChatGPT, all within Colleges of Education in North-West, Nigeria. These objectives were followed with the following research questions:

1. What are the perceptions of Chemistry lecturers regarding the use of ChatGPT as an instructional tool in Colleges of Education, North-West, Nigeria?
2. To what extent do Chemistry lecturers accept the integration of ChatGPT into their instructional practices in Colleges of Education, North-West, Nigeria?
3. What are the differences in perception and acceptance in using ChatGPT among male and female chemistry lecturers in Colleges of Education, North-West, Nigeria?

These three objectives and questions were selected and asked because perception and acceptance represent the earliest and most decisive stages in the technology-adoption pathway: before lecturers can be expected to develop competence in using a tool, they must first regard it favourably and be willing to engage with it. Understanding these two dispositions, and whether they are evenly distributed across gender, therefore provides a foundation upon which subsequent training and infrastructural interventions can be meaningfully designed. The significance of this study extends across several stakeholder groups. For policymakers and the National Commission for Colleges of Education, the findings offer an evidence base for designing teacher-training curricula and digital-literacy initiatives that are responsive to lecturers' actual dispositions rather than assumed resistance or enthusiasm. For College administrators, the results clarify where institutional support is lagging behind lecturer readiness, informing decisions about infrastructure investment and policy development. For Chemistry lecturers themselves, the study offers a mirror of their collective disposition, potentially validating individual attitudes and encouraging peer-supported adoption. For the research community, the study extends the sparse literature on gender-disaggregated technology acceptance among African science educators, offering a comparative reference point for future studies conducted in similar low-resource, teacher-training contexts. Ultimately, given that pre-service teachers trained by these lecturers will carry forward whatever pedagogical models they are exposed to, understanding lecturers' perception and acceptance of ChatGPT has implications that extend beyond the immediate research setting into the quality of future secondary school science instruction across Nigeria.

2 Literature Review and Theoretical Framework

2.1 Conceptual Review

Perception, in the context of educational technology, refers to lecturers' beliefs and attitudes toward the usefulness and ease of use of a given tool. Studies conducted since ChatGPT's release consistently describe lecturer perception as ambivalent, combining optimism about instructional benefits with reservations about risk. On the positive side, lecturers have been found to view ChatGPT as capable of reducing workload, improving instructional efficiency and supporting struggling learners (Chaka et al. 2024; Prieto et al. 2023). At the same time, lecturers express concern over academic integrity, the possibility of fabricated or misleading output, and their own inadequate training to use the tool effectively (Mutammimah et al. 2024). Trust has also been identified as a factor that shapes whether ChatGPT is perceived as an opportunity or a threat, with higher trust generally associated with more favourable perception (Shahzad et al. 2024). Acceptance denotes lecturers' willingness to adopt a technology into their instructional practice, and is typically explained through constructs such as perceived usefulness, perceived ease of use, trust, social influence and perceived risk. Barakat et al. (2025), using

an instrument grounded in the Technology Acceptance Model, found that perceived usefulness, effectiveness and technology readiness were positively associated with acceptance among university educators, while anxiety and perceived risk reduced it. Similarly, Habibi (2023) found that performance expectancy, effort expectancy and facilitating conditions predicted behavioural intention to use ChatGPT. In the Nigerian context, Ojo (2024) reported that lecturers were more inclined to accept ChatGPT when they perceived clear advantages for workload reduction and content delivery, but that acceptance was tempered by ethical concerns and uncertainty about institutional policy. Taken together, these studies suggest that acceptance is not simply a function of favourable attitudes but is jointly shaped by trust, institutional support and infrastructural readiness.

2.2 Theoretical Framework

This study is anchored on the Technology Acceptance Model (TAM), developed by Davis (1989). TAM posits that two constructs, perceived usefulness (PU) and perceived ease of use (PEOU), shape users' attitudes toward a technology and, in turn, their acceptance and actual use of it. PU reflects the degree to which lecturers believe ChatGPT enhances their instructional performance, while PEOU reflects the extent to which they perceive it as effortless to use. TAM has been widely applied to explain educators' acceptance of digital tools and has been extended in recent studies to incorporate trust as a moderating factor, given that lecturers' confidence in the accuracy of AI-generated output substantially influences whether perceived usefulness translates into acceptance (Foroughi et al. 2025, as cited in the broader TAM literature). TAM is particularly suited to the present study because it links the cognitive evaluation of a tool (perception) directly to the behavioural outcome of adopting it (acceptance), the two central variables under investigation. In the Nigerian context, TAM further highlights how infrastructural limitations, such as unreliable internet access, may depress PEOU even where PU is high, offering a useful lens for interpreting lecturers' dispositions toward ChatGPT in under-resourced Colleges of Education.

2.3 Empirical Review

A growing body of empirical work supports the view that educators generally hold positive perceptions of ChatGPT. Prieto et al. (2023), in a Latin American study, found that faculty saw ChatGPT as a valuable partner for generating instructional materials and diversifying teaching methods. In a Nigerian secondary-school context, however, Sunday et al. (2025) reported very low levels of AI awareness and mixed perceptions among teachers, with demographic variables including gender, teaching experience and school location significantly shaping perception. This divergence suggests that perception of AI tools may vary considerably depending on educational level, institutional exposure and access to digital infrastructure. On acceptance, Oladipo et al. (2025) found that pre-service science teachers in Nigeria demonstrated strong acceptance of ChatGPT, driven largely by perceived usefulness and ease of use, although concerns about accuracy and plagiarism persisted. Adeleke et al. (2025), studying lecturers in North-Central Nigerian public universities, similarly found high acceptance of ChatGPT for instructional delivery, with perceived usefulness, perceived ease of use and institutional support all significant predictors. Comparable findings have emerged outside Nigeria: Napal Fraile and Badiola (2024) reported high acceptance among trainee teachers in Spain, while Mukred et al. (2023) found that academics generally accepted ChatGPT once they perceived it as useful and compatible with existing teaching methods, though privacy and reliability concerns tempered adoption in some cases.

Evidence on gender differences in AI perception and acceptance is comparatively sparse but leans toward the conclusion that gender exerts little independent influence once technological exposure and institutional support are accounted for. Cabero-Almenara et al. (2024), studying university faculty in Ecuador, found that although female lecturers displayed slightly stronger constructivist pedagogical orientations, gender did not significantly affect acceptance of AI in education. Bergdahl and Sjöberg (2025) likewise found that teachers' AI self-efficacy and readiness to integrate generative AI chatbots were more strongly predicted by prior exposure and collegial support than by gender. Okafor and Salisu (2024), studying lecturers in Colleges of Education in South-West Nigeria, similarly reported no major demographic disparities in ChatGPT-related outcomes, attributing competence instead to prior training and institutional support. In contrast, Sunday et al. (2025) found that gender did significantly shape teachers' perception of AI integration among secondary school teachers, suggesting that the influence of gender may vary by educational level and institutional context.

Several of the studies reviewed also point to the conditions under which positive perception and acceptance are most likely to be sustained. Ali et al. (2024), in a systematic review of ChatGPT in teaching and learning, concluded that perceived usefulness and ease of use were the most consistently reported predictors of positive attitudes across studies, but cautioned

that these attitudes could erode without continued institutional support and clear ethical guidelines. This observation is echoed by Firat (2023), who argued that generative AI tools are most successfully integrated into instruction when educators are supported through structured professional development rather than left to develop competence independently. Taken together, the empirical record suggests a fairly consistent picture: lecturers across diverse national contexts tend to view ChatGPT favourably and are willing to adopt it, gender differences are generally minimal where technological exposure is comparable, and the sustainability of these positive dispositions depends heavily on institutional facilitation rather than on further convincing of lecturers who, in most studies, are already inclined to embrace the technology.

It is worth noting that perception and acceptance, while conceptually distinct, are closely intertwined in the technology-adoption literature: favourable perception is generally treated as a necessary, though not always sufficient, precursor to acceptance. A lecturer may perceive ChatGPT as useful in principle while still hesitating to adopt it in practice because of institutional, infrastructural or ethical constraints, which is precisely the pattern this study investigates by examining the two constructs separately rather than assuming they move in lockstep. This distinction is particularly relevant in Chemistry education, where lecturers must additionally judge whether ChatGPT's general-purpose language generation can be trusted for a subject requiring precise quantitative reasoning and adherence to established scientific conventions, a domain-specific consideration that may not apply equally to humanities or social science disciplines in which much of the existing acceptance literature has been situated.

2.4 Research Gap

While the reviewed literature demonstrates growing global and African interest in lecturers' perception and acceptance of ChatGPT, few studies have focused specifically on Chemistry lecturers within Colleges of Education, an institutional category distinct from universities in its mandate to prepare NCE-level science teachers. Fewer still have examined whether perception and acceptance differ by gender within this specific population, despite the practical importance of ensuring equitable AI-integration outcomes in a professional group that, as this study's own data show, is markedly male-dominated. This study addresses that gap by providing context-specific, gender-disaggregated empirical evidence on Chemistry lecturers' perception and acceptance of ChatGPT in North-West Nigeria.

3 Materials and Methods

3.1 Research Design

The study adopted a cross-sectional descriptive survey design, which is appropriate for describing the existing attitudes, beliefs, and behaviours of a population without manipulating variables (Creswell & Creswell, 2018).

3.2 Population and Sample

The target population comprised 244 Chemistry lecturers drawn from fourteen public Colleges of Education in the North-West geopolitical zone of Nigeria. A sample of 152 lecturers was selected from twelve of these institutions, based on the recommendations of research advisor (2006). This is because two institutions, out of the fourteen, were used for a pilot test. Proportionate random sampling was used to allocate participants across institutions, followed by simple random sampling to select individual respondents within each institution. Of the 152 questionnaires administered, 139 were successfully retrieved and found complete, representing a response rate of 91.45%.

Table **1**

Sample of the Study

S/N	Institutions	Chemistry Lecturers	Sample Size
1	Kaduna State College of Education, Gidan-Waya	30	21
2	Sa'adatu Rimi College of Education, Kano	32	23
3	Federal College of Education (Technical), Bichi, Kano	29	21
4	Aminu Kano College of Islamic and Legal Studies	09	06
5	Federal College of Education, Katsina	17	12

6	Isa Kaita College of Education, Dutsin-ma, Katsina	10	7
7	Jigawa State college of Education, Gumel	15	11
8	Zamfara State College of Education, Maru	13	09
9	Shehu Shagari College of Education, Sokoto	27	19
10	Adamu Augie College of Education, Argungu, Kebbi State	15	11
11	Federal College of Education, Gidan Madi, Sokoto state	12	09
12	Federal College of Education (Technical), Yauri, Kebbi State	04	03
	Total	**213**	**152**

3.3 Instrumentation

Data were collected using a structured instrument titled the Lecturers' Perception, Acceptance and Competence in Using ChatGPT Questionnaire (LPACCQ), developed by the researcher. For the purposes of this article, only the demographic section (gender) and the sections measuring lecturers' perception and acceptance were analysed. The perception and acceptance sections each consisted of ten items structured on a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1). A benchmark mean score of 3.00 was used to determine respondents' level of agreement.

3.4 Validity and Reliability

The instrument was subjected to face and content validation by experts in Educational Technology, Science Education, and Measurement and Evaluation. Their observations and recommendations were incorporated to improve the clarity and relevance of the questionnaire items. A pilot study was conducted with 20 Chemistry lecturers from two Colleges of Education that were excluded from the main study, but were part of the population. The pilot data yielded a Cronbach's alpha reliability coefficient of .859, indicating strong internal consistency of the instrument (Zakariya, 2022).

3.5 Data Collection Procedure

Following institutional approval, the validated questionnaire was administered by the researcher with the assistance of trained research assistants. Where necessary, an equivalent Google Forms version of the questionnaire was distributed to participants. Before completing the questionnaire, respondents were informed of the purpose of the study and assured of the confidentiality and anonymity of their responses.

3.6 Data Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics, including frequency counts, percentages, means, and standard deviations, were used to answer the research questions, with a mean score of 3.00 and above interpreted as agreement. Inferential statistics were employed to test the hypotheses. One-sample *t*-test was used to determine whether the observed levels of lecturers' perception and acceptance were statistically significant, while the Mann-Whitney U test was used to examine differences between male and female Chemistry lecturers. All hypotheses were tested at the .05 level of significance.

4 Results

Research Questions 1: What are the perceptions of Chemistry lecturers regarding the use of ChatGPT as an instructional tool in Colleges of Education, North-West, Nigeria?

Table **2**

Mean and Standard Deviation of Lecturers' Perception of ChatGPT

S/N	Item	Mean	SD	Decision
1	ChatGPT can help simplify abstract chemistry concepts for better understanding.	4.43	0.68	Agreed
2	ChatGPT enhances students' engagement in chemistry lessons.	3.99	0.92	Agreed
3	ChatGPT improves the quality of instructional delivery in chemistry.	4.17	0.93	Agreed

4	ChatGPT provides instant access to relevant chemistry content and examples.	4.60	0.66	Agreed
5	ChatGPT promotes learner-centered approaches in chemistry teaching.	4.06	0.92	Agreed
6	ChatGPT increases my efficiency in lesson planning.	4.35	0.75	Agreed
7	ChatGPT may sometimes generate inaccurate chemistry information	3.27	1.17	Agreed
8	ChatGPT is a valuable digital tool that complements traditional chemistry instruction.	4.01	0.93	Agreed
9	ChatGPT poses threat to academic integrity in students' work.	3.89	1.14	Agreed
10	Overall, I have a positive perception of ChatGPT as an educational tool in chemistry teaching.	4.26	0.86	Agreed
	Grand Mean	**4.10**		**Agreed**

Decision Mean = 3.00

Table 2 shows that all ten items recorded mean scores above the 3.00 benchmark, yielding a grand mean of 4.10, which indicates a significantly positive perception of ChatGPT among Chemistry lecturers. Respondents most strongly agreed that ChatGPT provides instant access to relevant chemistry content (mean = 4.60) and simplifies abstract chemistry concepts (mean = 4.43). Notably, lecturers also agreed, though more moderately, that ChatGPT may generate inaccurate information (mean = 3.27) and poses a threat to academic integrity (mean = 3.89), indicating that favourable perception coexists with an awareness of the tool's limitations.

Research Question Two: To what extent do Chemistry lecturers accept the integration of ChatGPT into their instructional practices in Colleges of Education, North-West Nigeria?

Table **3**

Mean and Standard Deviation of Lecturers' Acceptance of ChatGPT

S/N	Item	Mean	SD	Decision
11	I am willing to use ChatGPT regularly in my chemistry teaching.	4.27	0.81	Agreed
12	I intend to incorporate ChatGPT into my future teaching activities.	4.19	0.88	Agreed
13	ChatGPT is easy to use once guidance is provided.	4.53	0.74	Agreed
14	My colleagues' attitudes toward ChatGPT influence my willingness to use it.	3.88	1.00	Agreed
15	I feel confident recommending ChatGPT to fellow chemistry lecturers.	4.10	0.90	Agreed
16	My institution supports ChatGPT use in teaching.	3.76	0.95	Agreed
17	Adequate training would increase my acceptance of ChatGPT.	4.29	0.79	Agreed
18	I would adopt ChatGPT if my institutional facilities (internet, electricity) were adequat.	4.22	0.75	Agreed
19	I believe ChatGPT has long-term benefits for chemistry education.	4.36	0.83	Agreed
20	I am open to continuous use of ChatGPT in improving chemistry teaching and learning.	4.35	0.76	Agreed
	Grand Mean	**4.19**		**Agreed**

Decision Mean = 3.00

Table 3 shows that all ten items exceeded the benchmark mean, producing a grand mean of 4.19, indicating a high level of acceptance. Lecturers most strongly agreed that ChatGPT is easy to use once guidance is provided (mean = 4.53) and that it has long-term benefits for chemistry education (mean = 4.36). The lowest-rated item, institutional support for ChatGPT use (mean = 3.76), while still above benchmark, suggests that institutional facilitation lags slightly behind lecturers' personal willingness to adopt the tool.

Hypotheses One and Two: H01 stated that there is no significant positive perception among Chemistry lecturers toward the use of ChatGPT; H02 stated that there is no significant difference in the level of acceptance of ChatGPT integration among Chemistry lecturers. Both hypotheses were tested using One-Sample t-Test analysis, summarised in Table 4.

Table **4**

One-Sample t-test Analysis of Chemistry Lecturers' Perception and Acceptance toward the Use of ChatGPT in Teaching Chemistry

Variable	N	Test Value	Mean	SD	*t*-cal	df	*p*-value	Cohen's d	Decision
Perception	139	3.00	4.10	0.52	25.19	138	.001	2.12	Rejected
Acceptance	139	3.00	4.19	0.58	24.34	138	.001	2.05	Rejected

Source: Field survey, 2026

As shown in Table 4, the calculated *t*-value for perception (25.19) was statistically significant at 138 degrees of freedom (p = .001), indicating that the observed mean perception differed significantly from the hypothesised average, demonstrating a statistically significant positive perception of ChatGPT among Chemistry lecturers. H_{01} was therefore rejected. Similarly, the calculated *t*-value for acceptance (24.34) was statistically significant at 138 degrees of freedom (p = .001), also indicating that the observed mean acceptance differed significantly from the hypothesised average, demonstrating a statistically significant high level of acceptance of ChatGPT integration among Chemistry lecturers. H_{02} was therefore rejected. The Cohen's *d* of 2.12 and 2.05 for perception and acceptance respectively indicate a very large effect size, suggesting that the difference between the observed perception and acceptance level and the benchmark value of 3.00 was substantial.

Hypothesis Three: There are no significant differences between male and female Chemistry lecturers' perception and acceptance of ChatGPT. This hypothesis was tested using the Mann-Whitney U test, summarised in Table 5.

Table **5**

Mann–Whitney U Test on the differences in Male and Female Lecturers' Perception and Acceptance of ChatGPT

Variable	Gender	N	Mean Rank	Sum of Ranks	Mann–Whitney U	p-value	Decision
Perception	Male	110	68.64	7550.00	1445.00	0.437	Not Significant
	Female	29	75.17	2180.00			
Acceptance	Male	110	69.72	7669.50	1564.50	0.876	Not Significant
	Female	29	71.05	2060.50			

Source: Field survey, 2026

Table 5 shows no statistically significant difference between male and female lecturers' perception of ChatGPT (U = 1445.00, p = .437) or their acceptance of ChatGPT (U = 1564.50, p = .876). In both cases, the p-values exceeded the 0.05 threshold, and H_{03} was therefore retained. However, the findings should be interpreted with some caution because of the substantial imbalance in the gender distribution of the respondents, with 110 male lecturers compared with only 29 female lecturers. The relatively small number of female lecturers may have reduced the statistical power of the Mann–Whitney U test to detect smaller gender-related differences. Thus, the non-significant results indicate that no statistically significant gender differences were detected in the present sample, but they should not be interpreted as definitive evidence that gender differences do not exist. Taken together, the results in Tables 2 through 5 present a coherent pattern: Chemistry lecturers, irrespective of gender, hold strongly favourable views of ChatGPT and are highly disposed to adopt it into their instructional practice, with the principal source of restraint being institutional and infrastructural rather than personal or attitudinal.

5 Discussion

The finding that Chemistry lecturers hold significantly positive perceptions of ChatGPT (grand mean = 4.10) suggests that lecturers generally view the tool as capable of improving instructional delivery, simplifying difficult concepts and supporting lesson preparation, consistent with the perceived-usefulness component of TAM. This finding aligns with Watted et al. (2024), who found that lecturers expressed general optimism toward AI integration in teaching, and with Garofalo and Farenga (2024), who reported that secondary science teachers were cautiously optimistic about AI in science classrooms. It also corroborates Mutanga et al. (2024) and Ofosu-Ampong (2024), both of whom found predominantly positive lecturer perceptions of ChatGPT in African higher education contexts. The consistency across these studies, despite differing institutional and national contexts, suggests that positive perception of ChatGPT's pedagogical potential is becoming a fairly stable pattern among African educators. However, the present finding contrasts with Sunday et al. (2025), who reported low AI awareness and mixed perceptions among Nigerian secondary school teachers; this divergence may

reflect the fact that lecturers in tertiary teacher-training institutions typically have greater access to digital infrastructure and professional development opportunities than secondary school teachers, consistent with TAM's emphasis on facilitating conditions as a precursor to favourable perception.

The high level of acceptance recorded, with a grand mean of 4.19, similarly aligns with Ofosu-Ampong (2024) and Adeleke et al. (2025), both of whom found strong lecturer willingness to integrate ChatGPT into instructional practice, and with Oladipo et al. (2025) and Napal Fraile and Badiola (2024), who reported comparable acceptance levels among pre-service and trainee teachers. The consistency of these findings across practising and trainee educators suggests that perceived usefulness and ease of use, the two core TAM constructs, robustly predict acceptance across career stages. The comparatively lower, though still above-benchmark, mean recorded for institutional support (3.76) is in line with Barakat et al. (2025) and Habibi (2023), both of whom identified facilitating conditions as an important moderator of acceptance; it suggests that while Chemistry lecturers are personally disposed to adopt ChatGPT, institutional infrastructure and policy have not yet fully caught up with this readiness. This finding is in contrast to Mukred et al. (2023), who found that privacy and reliability concerns more substantially tempered acceptance among academics in their sample, a difference that may be attributable to variations in institutional environment and prior AI exposure between the two study populations.

Before turning to the gender comparison, it is worth situating the overall pattern of positive perception and high acceptance within the broader question of sustainability. High initial enthusiasm toward a new educational technology does not automatically guarantee sustained instructional use, particularly where, as noted above, institutional support trails personal readiness; the literature reviewed suggests that the transition from favourable disposition to durable classroom practice typically depends on continued access to training, reliable infrastructure and visible institutional endorsement, each of which offers a concrete point of intervention for the recommendations that follow. The absence of a statistically significant gender difference in either perception ($p = .437$) or acceptance ($p = .876$) indicates that male and female Chemistry lecturers in the sampled Colleges of Education hold comparably favourable dispositions toward ChatGPT, despite the marked gender imbalance in the profession itself (79.14% male versus 20.86% female). This finding is consistent with Cabero-Almenara et al. (2024), who found that gender did not significantly affect AI acceptance among university faculty even though female lecturers exhibited somewhat different pedagogical orientations, and with Bergdahl and Sjöberg (2025), who found that AI readiness was more strongly predicted by exposure and collegial support than by gender. It also aligns with Okafor and Salisu (2024), who reported no significant demographic disparities among lecturers in Colleges of Education in South-West Nigeria. Collectively, these findings support the interpretation that once lecturers, regardless of gender, have comparable access to digital tools and professional exposure, gender ceases to be a meaningful determinant of technology-related attitudes. However, the finding departs from Sunday, Bassey et al. (2025), who found that gender significantly shaped teachers' perceptions of AI integration among secondary school teachers; this discrepancy may again reflect differences between the secondary and tertiary education contexts, where lecturers in Colleges of Education, irrespective of gender, are likely to share more similar levels of digital exposure and institutional access than teachers in more heterogeneous secondary school settings.

Interpreted through the lens of TAM, these results suggest that both perceived usefulness and perceived ease of use are operating strongly and fairly uniformly across the sampled population, producing high perception and acceptance scores that are not meaningfully moderated by gender. The persistence of concerns about accuracy and academic integrity within an overall positive perception profile, however, indicates that lecturers are not uncritical adopters; rather, their acceptance appears to be a considered judgement that weighs instructional benefit against known limitations, a pattern consistent with the risk-perception dimension emphasised in extended TAM applications (Barakat et al. 2025). A further point of interpretation concerns the pronounced gender imbalance observed in the sample itself, where male lecturers outnumbered their female counterparts by close to four to one. While this imbalance did not translate into a difference in perception or acceptance, it nonetheless raises a distinct policy consideration separate from the statistical finding of parity: even where existing female lecturers are as receptive to ChatGPT as their male colleagues, their small number means that any peer-influence or informal knowledge-sharing benefits associated with acceptance, as highlighted by Barakat et al. (2025) in relation to social influence, are likely to circulate primarily within a male-dominated network. This suggests that gender parity in disposition should not be mistaken for gender parity in opportunity, and that institutional efforts to broaden participation in AI-integration initiatives should attend to both dimensions.

6 Conclusion

This study set out to assess Chemistry lecturers' perception of ChatGPT, examine their level of acceptance of its integration into instructional practice, and compare these dispositions between male and female lecturers in Colleges of Education, North-West Nigeria. The findings establish that Chemistry lecturers hold significantly positive perceptions of ChatGPT and demonstrate significantly high acceptance of its integration into teaching, recognising the tool's capacity to simplify abstract concepts, support lesson preparation and enhance instructional delivery, while remaining attentive to its limitations regarding accuracy and academic integrity. The study further establishes that these favourable dispositions are not significantly influenced by gender, indicating comparable readiness for ChatGPT integration among male and female Chemistry lecturers despite the pronounced gender imbalance within the profession. These findings position Chemistry lecturers in North-West Nigeria as a receptive population for the introduction of structured, well-supported ChatGPT integration initiatives, provided that institutional infrastructure and policy support are strengthened to match lecturers' personal readiness.

The findings should be interpreted with a few limitations in mind. The sample, though adequately powered and drawn through a rigorous proportionate random sampling procedure, was confined to public Colleges of Education within one geopolitical zone of Nigeria, and the pronounced male-to-female ratio among respondents mirrors an existing occupational imbalance rather than a sampling artefact; caution should therefore be exercised in generalising the gender-comparison finding to contexts with a more balanced lecturer population. Additionally, as with all self-report survey instruments, responses reflect lecturers' stated perceptions and behavioural intentions rather than observed classroom behaviour, leaving open the question of how far positive perception and acceptance translate into sustained instructional use. Future research should employ longitudinal designs to track lecturers' actual classroom adoption of ChatGPT over time and complement self-reported data with classroom observations or other measures of actual use. Replication of the study across other geopolitical zones of Nigeria, preferably with more balanced gender representation, would further establish the generalisability of the findings and provide stronger evidence regarding gender-related differences in ChatGPT integration.

7 Declarations

Ethical Statements: This study involved the voluntary participation of Chemistry lecturers in public Colleges of Education, North-West, Nigeria and an informed consent was obtained from all respondents prior to questionnaire administration. Institutional approval to conduct the study was obtained from the Department of Educational Foundations and Curriculum, Ahmadu Bello University, Zaria, and permission was subsequently granted by the authorities of participating Colleges. No identifying information was collected, and all data were treated with strict confidentiality and used solely for the purposes of this research.

Conflict of Interest: The authors declare neither financial nor non-financial conflict of interest.

Author Contributions: MJA conceptualized the study, developed the research instrument, collected and analysed the data, and drafted the manuscript. SM supervised the design and analysis, provided critical revisions to the theoretical framing, and approved the final manuscript for submission. AUA supervised the data collection process, reviewed the methodology and results, and critically revised the manuscript for intellectual content. All authors read and approved the final manuscript.

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Data Availability Statement: The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

8 References

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