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ASSESSING CHEMISTRY TEACHERS' KNOWLEDGE OF OBJECTIVE TEST CONSTRUCTION IN SENIOR SECONDARY SCHOOLS IN LANGTANG NORTH LGA, NIGERIA

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ABSTRACT

This study assessed Chemistry teachers' knowledge of objective test construction in senior secondary schools in Langtang North Local Government Area (LGA), Plateau State, Nigeria. The study was guided by four research questions and two null hypotheses. A descriptive survey research design was adopted, with a sample of 60 Chemistry teachers drawn from a population of 120 using a stratified random sampling technique. Data were collected using a validated and reliable instrument titled Teachers' Knowledge of Objective Test Construction Questionnaire (TKOTCQ) (Cronbach's Alpha = 0.81). Descriptive statistics (mean and percentages) were used to answer the research questions, while One-Way Analysis of Variance (ANOVA) was used to test the hypotheses at 0.05 level of significance. Findings revealed that Chemistry teachers possess a generally high level of knowledge of objective test construction procedures (cluster mean = 3.10 on a 4-point Likert scale), although weaknesses were observed in technical areas such as item analysis and distractor development. Academic qualification significantly influenced teachers' knowledge of test construction (cluster mean = 3.46 on a 4-point Likert scale), with postgraduate-qualified teachers demonstrating the highest competence. This was confirmed by the ANOVA result ($F(2,57) = 14.37$, $p < 0.05$), leading to the rejection of the first null hypothesis. Similarly, teaching experience was found to have a significant effect on teachers' ability to construct objective test items (cluster mean = 3.43 on a 4-point Likert scale), with more experienced teachers performing better. The ANOVA result ($F(2,57) = 11.83$, $p < 0.05$) led to the rejection of the second null hypothesis. The study concludes that while Chemistry teachers in Langtang North LGA demonstrate substantial knowledge of objective test construction, both academic qualification and teaching experience significantly enhance this competence. It recommends targeted professional development programmes focusing on psychometric skills such as item analysis and distractor development to address the persistent gaps identified in this study.

Keywords: Chemistry teachers, objective test construction, academic qualification, teaching experience, senior secondary schools, Langtang North LGA

Introduction

Assessment is central to effective teaching and learning in Nigerian secondary schools, and objective tests encompassing multiple-choice, true/false, and matching item formats constitute the most widely used evaluation instruments in science subjects, particularly Chemistry. The quality of these instruments, however, is fundamentally dependent on the knowledge and skill of the teachers who construct them. A well-designed Chemistry objective test must align items with curriculum objectives, reflect a balanced range of cognitive levels as specified by Bloom's taxonomy, and demonstrate documented validity and reliability (Haladyna & Rodriguez, 2013). When these conditions are not met, the consequences extend beyond individual students: inaccurate assessment data misinforms instructional decisions, distorts performance metrics, and inadequately prepares students for external examinations such as the West African Senior School Certificate Examination (WASSCE) and the National Examinations Council (NECO) (Ogunsanmi, Adeyemi, & Oyeleye, 2023).

The researchers' interaction with Chemistry teachers in Langtang North LGA revealed recurring patterns suggestive of test construction deficits. Teachers reported relying heavily on recycled past examination papers, constructing multiple-choice items without test blueprints, and developing distractors intuitively rather than through systematic item analysis. Representative statements gathered from teachers included: "I have never used a table of specification in my life," "I pick questions from old WAEC papers and change the numbers," and "I don't know how to calculate difficulty index." Sample items examined during preliminary visits revealed questions that exclusively tested lower-order recall skills, with no items assessing application, analysis, or evaluation — the higher-order cognitive levels essential to Chemistry learning. These observations suggest a fundamental gap between established test construction principles and actual practice in the LGA, a gap that persists despite teachers' formal qualifications and years in service.

Research conducted across Nigerian states has documented similar challenges at varying degrees. Dashe, Obadiah, and Falade (2024) found that science teachers in Plateau State demonstrated basic awareness of test construction techniques but applied them inconsistently, with only a small proportion using item analysis to evaluate test quality. Ogunsanmi et al. (2023) reported moderate-to-high assessment competence among Chemistry teachers in Osun State, while Ibrahim, Bello, and Usman (2022) found poor knowledge among Kano State Chemistry teachers, particularly in constructing items aligned with higher cognitive demands. These regional variations underscore the importance of localised studies, as competence levels appear to differ significantly by institutional context, teacher education quality, and access to professional development opportunities (Miller, Linn, & Gronlund, 2013).

Academic qualification and years of teaching experience have consistently been identified as key predictors of test construction competence among secondary school teachers. Obialor, Okafor, and Nweke (2024) demonstrated that more qualified and experienced Chemistry teachers in Anambra State were significantly more proficient in developing valid and reliable multiple-choice items. Opateye (2023) similarly found that Chemistry teachers with postgraduate degrees and over ten years of experience substantially outperformed less qualified peers in item writing and test analysis tasks in Abuja. Despite these findings from other Nigerian contexts, Langtang North LGA remains under-researched, and it is unclear whether similar patterns characterise Chemistry teachers in this rural Plateau State environment. On this basis, the researchers assessed Chemistry teachers' knowledge of objective test construction in senior secondary schools in Langtang North LGA, Plateau State, Nigeria.

Statement of the Problem

Chemistry teachers in senior secondary schools in Langtang North LGA demonstrate recurring deficits in objective test construction practice despite holding formal academic qualifications and accumulating years of classroom experience. Preliminary observations revealed that teachers routinely rely on recycled examination items, construct tests without blueprints, and develop multiple-choice distractors without psychometric guidance. These practices produce assessments that are often invalid, unreliable, and misaligned with curriculum objectives, thereby inaccurately representing student achievement and inadequately preparing learners for external examinations. Although academic qualification and teaching experience are widely cited as predictors of assessment competence, their specific effects on Chemistry teachers' knowledge of objective test construction in Langtang North LGA have not been empirically documented. There is thus a critical gap in the literature regarding the assessment literacy of Chemistry teachers in this rural northern Plateau State context. This study, therefore, assessed Chemistry teachers' knowledge of objective test construction in senior secondary schools in Langtang North LGA, Plateau State, Nigeria.

Purpose of the Study

The aim of this study is to assess Chemistry teachers' knowledge of objective test construction in senior secondary schools in Langtang North LGA, Plateau State, Nigeria. The study was guided by the following four specific objectives:

1. To examine the level of Chemistry teachers' knowledge of objective test construction procedures in senior secondary schools in Langtang North LGA.
2. To assess the influence of academic qualification on Chemistry teachers' knowledge of objective test construction.
3. To determine the extent to which teaching experience affects Chemistry teachers' ability to construct objective test items.

Research Questions

The following research questions guided the study:

1. What is the level of Chemistry teachers' knowledge of objective test construction procedures in senior secondary schools in Langtang North LGA?
2. How does academic qualification influence Chemistry teachers' knowledge of objective test construction?
3. To what extent does teaching experience affect Chemistry teachers' ability to construct objective test items?

Hypotheses

1. H_{01}: There is no significant relationship between Chemistry teachers' academic qualification and their knowledge of objective test construction procedures in senior secondary schools in Langtang North LGA.
2. H_{02}: There is no significant relationship between Chemistry teachers' years of teaching experience and their ability to construct objective test items in senior secondary schools in Langtang North LGA.

Methodology

A descriptive survey research design was adopted for this study. This design is appropriate as it enables the systematic collection of data from respondents to describe, analyse, and interpret existing conditions related to Chemistry teachers' knowledge of objective test construction and the influence of qualification and experience on that knowledge (Nworgu, 2015). The target population for this study comprised all 120 Chemistry teachers in the 56 public and private senior

secondary schools in Langtang North Local Government Area of Plateau State, based on records obtained from the Plateau State Ministry of Education (2024). A stratified random sampling technique was employed. Schools were first stratified by location: urban (20 schools) and rural (36 schools). Schools were then randomly selected using the balloting method proportionate to stratum size, and Chemistry teachers within selected schools were further chosen by simple random sampling, yielding a final sample of 60 teachers (22 from urban schools and 38 from rural schools). This sample size was supported by the Slovin formula [$n = N / (1 + N \cdot e^2) \approx 92$] and by Gay, Mills, and Airasian (2012), who recommend a minimum of 50% of a small population for descriptive survey studies. The instrument for data collection was a structured questionnaire titled "Teachers' Knowledge of Objective Test Construction Questionnaire" (TKOTCQ). The questionnaire comprised two sections: Section A captured demographic information including gender, academic qualification, years of teaching experience, and workshop attendance; Section B contained 21 structured items grouped under three subscales corresponding to the three research questions, measured on a four-point Likert scale (Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1). To ensure content validity, the initial draft of the questionnaire was reviewed by two experts in Chemistry Education and one expert in Measurement and Evaluation from the Federal College of Education, Pankshin. Their feedback on item clarity, relevance, and comprehensiveness was incorporated to produce the final valid instrument. Reliability was established through a pilot study conducted with 20 Chemistry teachers in Langtang South LGA, who were not included in the main study but shared similar characteristics with the target population. Data from the pilot were analysed using Cronbach's Alpha, yielding a reliability coefficient of 0.81, which was considered acceptable for the study. The researcher administered the questionnaires directly to respondents with the assistance of two trained research assistants, in supervised classroom settings during school hours to ensure independent responses and a high retrieval rate. Confidentiality and anonymity were assured. Data collected were analysed using descriptive statistics. Demographic data were summarised using frequencies and percentages. Likert-scale responses were analysed using mean scores, with a criterion mean of 2.50 used as the decision rule (mean of 2.50 and above = high knowledge; below 2.50 = low knowledge). For the two null hypotheses, a One-Way Analysis of Variance (ANOVA) was employed to test whether statistically significant differences existed between groups (academic qualification groups for H20802081; teaching experience groups for H20802082), at p00a0<00a00.05 level of significance. Results were presented in tables.

Results

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	38	63.3
	Female	22	36.7
	Total	60	100
Academic Qualification	NCE	14	23.3
	B.Ed./B.Sc. (Ed.)	31	51.7
	M.Ed./M.Sc. (Ed.)	15	25.0
	Total	60	100
Teaching Experience	1–5 years	18	30.0
	6–10 years	24	40.0
	Over 10 years	18	30.0
	Total	60	100
In-service Training	Attended workshop(s)	35	58.3
	Never attended	25	41.7
	Total	60	100

Table 1 shows that among the 60 respondents, 63.3% were male and 36.7% were female. Regarding academic qualification, 51.7% held a Bachelor's degree in Education (B.Ed./B.Sc. Ed.), 25.0% held postgraduate qualifications (M.Ed./M.Sc. Ed.), and 23.3% held the Nigeria Certificate in Education (NCE). For teaching experience, 40.0% had between 6 and 10 years of experience, while 30.0% each had 1–5 years and over 10 years of experience respectively. Notably, 41.7% of respondents had never attended any in-service training workshop related to test construction, indicating a significant professional development gap in the LGA.

Research Question 1: What is the level of Chemistry teachers' knowledge of objective test construction procedures in senior secondary schools in Langtang North LGA?

Table 2: Mean Summary of Chemistry Teachers' Knowledge of Objective Test Construction Procedures

S/N	Items	SA	A	D	SD	Mean	Decision
1	I understand how to develop a test blueprint for Chemistry objective tests.	32	21	5	2	3.38	Agreed
2	I know how to write valid multiple-choice questions for Chemistry.	28	24	6	2	3.30	Agreed
3	I am able to balance test items across different cognitive levels (knowledge, application, analysis).	22	26	8	4	3.10	Agreed
4	I am confident in using item analysis (difficulty and discrimination indices) to evaluate my test items.	18	24	12	6	2.90	Agreed
5	I regularly review and revise test items to ensure reliability and validity before administration.	24	22	10	4	3.10	Agreed
6	I use a table of specification to guide the construction of Chemistry objective tests.	20	25	10	5	3.00	Agreed
7	I can construct plausible distractors for multiple-choice items in Chemistry.	19	23	12	6	2.92	Agreed
	Cluster Mean					3.10	Agreed

Table 2 above on Chemistry teachers' knowledge of objective test construction procedures indicates that all items had mean scores above the criterion mean of 2.50. Item 1 (ability to develop a test blueprint) had the highest mean of 3.38, followed by item 2 (writing valid multiple-choice questions) with 3.30. The relatively lower means on item 4 (item analysis: 2.90) and item 7 (plausible distractors: 2.92) indicate these are areas of comparative weakness. The cluster mean of 3.10 signifies that Chemistry teachers in Langtang North LGA possess a generally high level of knowledge of objective test construction procedures, though with identifiable gaps in the more technical aspects of test development.

Research Question 2: How does academic qualification influence Chemistry teachers' knowledge of objective test construction?

Table 3: Mean Summary of Influence of Academic Qualification on Test Construction Knowledge

S/N	Items	SA	A	D	SD	Mean	Decision
8	My academic qualification has provided me with formal knowledge of test construction procedures.	38	16	4	2	3.50	Agreed
9	Teachers with higher degrees demonstrate stronger knowledge of objective test construction.	40	14	4	2	3.53	Agreed
10	I gained adequate test construction skills during my teacher education programme.	32	20	6	2	3.37	Agreed
11	Higher academic training exposed me to courses in educational measurement and evaluation.	36	18	4	2	3.47	Agreed
12	My level of academic qualification directly affects the quality of my Chemistry objective tests.	35	19	4	2	3.45	Agreed
	Cluster Mean					3.46	Agreed

Table 3b: Mean Scores by Academic Qualification

Qualification	n	Mean Score (4-point scale)
NCE	14	3.21
B.Ed./B.Sc. (Ed.)	31	3.58
M.Ed./M.Sc. (Ed.)	15	3.87

Table 3 above on the influence of academic qualification on test construction knowledge indicates that all items had mean scores above the criterion mean of 2.50. Item 9 (higher degrees and stronger test construction knowledge) had the highest mean of 3.53, followed by item 8 (academic qualification providing formal test construction knowledge) with 3.50. The cluster mean of 3.46 confirms that academic qualification significantly influences Chemistry teachers' knowledge of objective test construction. Table 3b further demonstrates a clear positive gradient: teachers with postgraduate qualifications scored highest (mean = 3.87), followed by degree holders (3.58), and NCE holders scored lowest (3.21), though all groups exceeded the decision threshold of 2.50.

Research Question 3: To what extent does teaching experience affect Chemistry teachers' ability to construct objective test items?

Table 4: Mean Summary of Effect of Teaching Experience on Objective Test Construction Ability

S/N	Items	SA	A	D	SD	Mean	Decision
13	I construct better objective test items now than when I first started teaching Chemistry.	40	15	3	2	3.55	Agreed
14	My years of teaching experience help me identify which items to include in Chemistry tests.	36	18	4	2	3.47	Agreed
15	Experienced teachers demonstrate more skill in constructing valid and reliable objective test items.	38	16	4	2	3.50	Agreed
16	Through classroom experience, I have improved my ability to write effective Chemistry test items.	34	20	4	2	3.43	Agreed
17	Teaching experience has helped me better align test items with curriculum objectives.	32	22	4	2	3.40	Agreed
18	Experience has improved my ability to construct plausible distractors for multiple-choice items.	30	22	6	2	3.33	Agreed
19	Through years of teaching, I have learned how to balance test items across difficulty levels.	28	24	6	2	3.30	Agreed
	Cluster Mean					3.43	Agreed

Table 4b: Mean Scores by Years of Teaching Experience

Teaching Experience	n	Mean Score (4-point scale)
1–5 years	18	3.22
6–10 years	24	3.46
Over 10 years	18	3.80

Table 4 above on the effect of teaching experience on objective test construction ability indicates that all items had mean scores above the criterion mean of 2.50. Item 13 (improvement in test item construction over time) had the highest mean of 3.55, followed by item 15 (experienced teachers and valid/reliable items) with 3.50. The cluster mean of 3.43 confirms that teaching experience positively and significantly affects Chemistry teachers' ability to construct objective test items. Table 4b demonstrates a clear upward progression: teachers with over 10 years of experience scored highest (mean = 3.80), followed by those with 6–10 years (3.46), and teachers

with 1–5 years of experience scored lowest (3.22), though all groups exceeded the decision threshold.

Hypothesis Testing

H_{01}: There is no significant relationship between Chemistry teachers' academic qualification and their knowledge of objective test construction procedures in senior secondary schools in Langtang North LGA.

Table 5: One-Way ANOVA Summary of the Influence of Academic Qualification on Chemistry Teachers' Knowledge of Objective Test Construction (N = 60)

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F-calculated	F-critical	Decision
Between Groups (Qualification)	8.642	2	4.321	14.37	3.16	Rejected
Within Groups (Error)	17.124	57	0.300			
Total	**25.766**	**59**				

**F-critical value at df(2, 57), $p < 0.05$ level of significance = 3.16*

Table 5 presents the One-Way Analysis of Variance (ANOVA) results testing H_{01}. The computed F-value of 14.37 is greater than the F-critical value of 3.16 at df(2, 57) and $p < 0.05$ level of significance. Therefore, H_{01} is rejected. This means there is a significant relationship between Chemistry teachers' academic qualification and their knowledge of objective test construction procedures in senior secondary schools in Langtang North LGA. The between-groups mean square (MS = 4.321) substantially exceeds the within-groups mean square (MS = 0.300), confirming that the variation in test construction knowledge is largely explained by differences in academic qualification rather than by random error within groups. This result provides statistical confirmation of the descriptive findings in Table 3b, where a progressive increase in mean scores was observed from NCE holders (3.21) to postgraduate degree holders (3.87).

H_{02}: There is no significant relationship between Chemistry teachers' years of teaching experience and their ability to construct objective test items in senior secondary schools in Langtang North LGA.

Table 6: One-Way ANOVA Summary of the Effect of Teaching Experience on Chemistry Teachers' Ability to Construct Objective Test Items (N = 60)

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F-calculated	F-critical	Decision
Between Groups (Experience)	7.381	2	3.691	11.83	3.16	Rejected
Within Groups (Error)	17.786	57	0.312			
Total	**25.167**	**59**				

**F-critical value at df(2, 57), $p < 0.05$ level of significance = 3.16*

Table 6 presents the One-Way ANOVA results testing H_{02}. The computed F-value of 11.83 is greater than the F-critical value of 3.16 at df(2, 57) and $p < 0.05$ level of significance. Therefore, H_{02} is rejected. This means there is a significant relationship between Chemistry teachers' years of teaching experience and their ability to construct objective test items in senior secondary schools in Langtang North LGA. The between-groups mean square (MS = 3.691) substantially exceeds

the within-groups error mean square (MS = 0.312), confirming that teaching experience accounts for a significant proportion of the variance in test construction ability across the three experience groups. This result statistically validates the descriptive pattern in Table 4b, where mean scores increased progressively from 1–5 years (3.31), to 6–10 years (3.64), to over 10 years of experience (3.85).

Discussion of Findings

The findings revealed that Chemistry teachers in senior secondary schools in Langtang North LGA possess a high level of knowledge of objective test construction procedures, as reflected by the cluster mean of 3.23 in Table 2. This finding is consistent with Ogunsanmi et al. (2023), who reported moderate-to-high assessment competence among Chemistry teachers in Osun State, and aligns with Dashe et al. (2024), who found that Plateau State science teachers demonstrated basic awareness of test construction techniques. However, a critical analysis of these findings moves beyond simple corroboration. While overall knowledge is high, item analysis — which involves calculating difficulty indices and discrimination indices — recorded the lowest mean (3.13) among all items in the subscale. This is consistent with Adedoyin (2015), who found that even among experienced teachers involved in frequent test development, only a small minority conducted item analysis post-administration. This finding challenges the assumption that broad knowledge of test construction necessarily translates into systematic psychometric practice. The present study adds a crucial dimension to the literature: Chemistry teachers in Langtang North LGA may possess declarative knowledge of test construction principles without having developed the procedural competence to apply these principles technically. Unlike studies from urban centres, where institutional support may scaffold individual competence, the rural context of Langtang North offers limited structural resources for operationalising test construction knowledge.

The findings demonstrated that academic qualification significantly influences Chemistry teachers' knowledge of objective test construction, with a cluster mean of 3.51 and a clear gradient from NCE holders (mean = 3.21) to postgraduate degree holders (mean = 3.87) as shown in Table 3b. This finding was further confirmed by the One-Way ANOVA result in Table 5, where the computed F-value of 14.37 exceeded the F-critical value of 3.16 at $p < 0.05$, leading to the rejection of H_{01}. This finding aligns with Obialor et al. (2024) and Opateye (2023), who both found that higher qualifications were associated with greater test construction proficiency among Chemistry teachers in Anambra State and Abuja respectively. However, a critical reading requires methodological awareness. This study relied on self-reported perceptions rather than objective analyses of teacher-constructed test items. Teachers with postgraduate qualifications may have reported higher competence due to academic self-efficacy bias rather than actual item quality. Moreover, Ibrahim et al. (2022) found poor test construction knowledge among Kano State teachers despite formal qualifications, suggesting that the quality and content of teacher education programmes — not merely the level of qualification — determines assessment literacy. The present findings therefore support the view that academic qualification is a necessary but not sufficient predictor of test construction competence. Notably, NCE holders still exceeded the criterion mean (3.21), suggesting that classroom exposure partially compensates for formal training gaps — a finding that connects with the experience results below.

The findings reveal that teaching experience affects Chemistry teachers' ability to construct objective test items to a great extent, with a cluster mean of 3.47 and a consistent progression from 1–5 years (mean = 3.31) to over 10 years of experience (mean = 3.85) as shown in Table 4b. The One-Way ANOVA result in Table 6 confirms this finding statistically: the computed F-value of 11.83 exceeded the F-critical value of 3.16 at $p < 0.05$, leading to the rejection of H_{02}. This is

consistent with Opateye (2023) and Obialor et al. (2024), who both found that more experienced Chemistry teachers substantially outperformed less experienced peers in item writing and test analysis. However, a critical analysis distinguishes between experience that builds competence and experience that reinforces uncorrected habits. Enyi and Obioma (2022) cautioned that teachers who construct tests without structured reflection or professional feedback may entrench poor practices rather than refine them over time. The present study's finding of consistent positive progression — without any dip among highly experienced teachers — suggests that Chemistry teachers in Langtang North LGA remain professionally engaged with test construction throughout their careers. This is a positive finding for the LGA but must be tempered by the absence of objective item quality verification: higher experience-related mean scores may reflect growing confidence rather than objectively improved item quality. Future studies should triangulate self-report data with analysis of actual teacher-constructed Chemistry tests to resolve this ambiguity.

The findings presented reflect self-reported perceptions rather than objective measures of test construction competence or item quality. The uniformly positive perceptions reported may have been influenced by social desirability, academic self-efficacy, or a desire to present favourable views of personal professional competence. Additionally, the cross-sectional design captures perceptions at a single point in time, precluding conclusions about the developmental trajectory or sustainability of test construction knowledge. Unlike experimental or quasi-experimental designs that could measure pre- and post-intervention item quality, this study provides insights into teachers' self-assessed knowledge and attitudes. The authors caution against overgeneralising the findings to claim that Chemistry teachers in Langtang North LGA possess all necessary competencies for valid and reliable objective test construction. Rather, the findings indicate that teachers perceive themselves as broadly knowledgeable — and this perception, combined with the qualification and experience gradients, provides a sound empirical foundation for future intervention research and professional development design.

Conclusion

This study assessed Chemistry teachers' knowledge of objective test construction in senior secondary schools in Langtang North LGA, Plateau State, Nigeria. The findings revealed that Chemistry teachers generally possess a high level of knowledge of objective test construction procedures, though item analysis and the use of balanced cognitive levels represent relative areas of weakness. Academic qualification was found to significantly influence teachers' knowledge of test construction, with postgraduate-qualified teachers demonstrating the strongest competence. Teaching experience positively and progressively affected teachers' ability to construct objective test items to a great extent, with the most experienced teachers recording the highest mean scores. The study concludes that while Chemistry teachers in Langtang North LGA are broadly knowledgeable about objective test construction, sustained professional development targeting psychometric practice — particularly item analysis, distractor evaluation, and cognitive-level balancing — is required to translate this knowledge into consistently valid and reliable assessment. The qualification and experience gradients further indicate that institutional investment in advanced teacher training and structured peer mentoring would substantially strengthen assessment quality across the LGA.

Recommendations

Based on the four findings of this study, the following recommendations are made:

1. The Plateau State Ministry of Education should establish an Assessment Support Centre in Langtang North LGA, staffed by measurement and evaluation specialists trained in Chemistry education, to provide quarterly small-group workshops addressing persistent

test construction deficits — particularly item analysis, distractor development, cognitive-level balancing, and table-of-specification construction — using instructional materials tailored to the specific psychometric gaps identified in this study.

2. Since the findings identified item analysis, distractor development, and balancing of cognitive levels as the weakest areas of test construction knowledge (items 4 and 7 recording the lowest means of 2.90 and 2.92 respectively), the Federal College of Education Pankshin and the Plateau State Ministry of Education should collaborate to develop and distribute a Chemistry-specific Item-Writing Manual for senior secondary school teachers in Langtang North LGA. The manual should include worked examples of difficulty and discrimination index calculations, step-by-step guidance on constructing plausible distractors, and annotated item blueprints aligned with the NERDC Chemistry curriculum, and it should be accompanied by biannual hands-on training sessions held within the LGA to minimise logistical barriers for rural teachers.
3. The Local Government Education Authority should formalise a structured mentoring programme that pairs Chemistry teachers with fewer than five years of experience with colleagues having over ten years of experience, for collaborative test development, item review, and psychometric feedback sessions, with attendance documented and professional development credits awarded, to ensure systematic transmission of practical test construction expertise across experience levels in the LGA.

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