Quality Assurance Personnel's Perceptions of Teachers' Instructional Practices and Students' Performance in Basic Science and Technology in The Federal Capital Territory, Nigeria

Katcha, M. A., Simeon, M. I. and Ishaku Gado
Department of Science and Environmental Education,
Faculty of Education, University of Abuja, Abuja, Nigeria
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Abstract
This study examined quality assurance personnel's perceptions of teachers' instructional practices and students' performance in Basic Science and Technology (BST) in junior secondary schools in the Federal Capital Territory (FCT), Abuja, Nigeria. A descriptive survey design was used. The population comprised 617 principals, vice-principals and quality assurance officers across the six Area Councils of the FCT. A planned sample of 357 respondents was selected through simple random sampling, while 343 valid responses were analyzed. Data were collected with the Perception of Quality Assurance Officers on Teachers' Job and Students' Performance Scale (PQAOTSPS), a four-point Likert instrument with a Cronbach's alpha reliability coefficient of 0.77. Mean and standard deviation answered the research questions, while independent-samples t-test and one-way ANOVA tested the hypotheses at the 0.05 level. Teachers' lesson preparation (M = 2.90, SD = 0.99), lesson presentation (M = 2.97, SD = 0.97) and classroom management (M = 3.03, SD = 0.95) were favourably perceived. Students' classroom activities (M = 2.77, SD = 1.02) and academic performance (M = 2.82, SD = 0.93) were perceived as moderate. School location significantly differentiated lesson-presentation and student-performance ratings, while years of experience significantly differentiated classroom-management ratings. The study concludes that favourable perceptions of teacher competence have not fully translated into equally strong student engagement, critical thinking and problem-solving. Strengthened inquiry-oriented instruction, continuous professional development and improved instructional resources are recommended.

Keywords: *Basic Science and Technology, quality assurance, teacher performance, student engagement, academic performance*

Introduction

Education is a central instrument for individual and societal development because it enables learners to acquire knowledge, skills, values and competencies for productive participation in society (Ekpo & Is'haq, 2014 cited in Is'haq et al., 2026). Within Nigeria's Universal Basic Education system, Basic Science and Technology occupies an important position because it provides learners with foundational scientific knowledge, technological awareness, scientific literacy and problem-solving abilities that are essential for subsequent learning and everyday decision-making.

Basic Science and Technology integrates fundamental ideas from several scientific and technological fields and serves as a foundation for later study in biology, chemistry, physics and technology-related disciplines. Its effective teaching at the junior secondary school level is therefore important for preparing learners for advanced science education and for developing the ability to apply scientific reasoning to real-life situations. The instructional quality of the subject depends not only on curriculum content but also on the preparedness of teachers, the clarity of lesson presentation, classroom management, students' active participation and the quality of learning outcomes. Quality assurance provides a systematic means of determining whether these instructional expectations are being met. In the Nigerian education system, quality assurance has increasingly moved beyond conventional inspection toward continuous monitoring, evaluation, feedback and improvement. The Federal Ministry of Education (2019) emphasizes that educational quality assurance should contribute to school improvement, provide valid and reliable evidence, and inform policy, planning, training and intervention. Quality assurance personnel therefore occupy an important position in evaluating curriculum implementation, instructional delivery, school processes and student outcomes.

Empirical studies have established the relevance of quality assurance to school effectiveness. Eziamaka, Manafa and Iheanacho (2022) reported a positive relationship between quality assurance measures and teachers' job performance in public secondary schools. Mganga and Lekule (2021) found that quality assurance activities contributed to teachers' confidence, professional growth, discipline, creativity and instructional improvement, while Rikichi, Bulus and Kwasau (2022) established that supervision and inspection were associated with improved instructional delivery. Evidence from East Africa also indicates that regular school visits, timely feedback and follow-up support can strengthen instructional practices and learning achievement (Makiya, Mnyanyi, & Ngirwa, 2022; Sululu, Ochieng, & Kirwok, 2023).

Despite this evidence, limited empirical attention has been given to the simultaneous assessment of teacher-related instructional processes and student-related outcomes specifically in Basic Science and Technology at the junior secondary school level in the Federal Capital Territory, Abuja. Existing studies have tended to focus on general secondary education, administrative effectiveness, supervision, curriculum implementation or overall academic outcomes. The present study addressed this contextual gap by examining quality assurance personnel's perceptions of teachers' lesson preparation, lesson presentation and classroom management alongside students' classroom activities and academic performance in Basic Science and Technology.

Objectives of the Study

The main objective of the study was to examine the perceptions of quality assurance personnel on teachers' jobs and students' performance in Basic Science and Technology in junior secondary schools in the Federal Capital Territory, Abuja, Nigeria. Specifically, the study sought to:

1. determine the perceptions of quality assurance personnel on teachers' lesson preparation to teach Basic Science and Technology in the FCT, Abuja;
2. determine the perceptions of quality assurance personnel on teachers' lesson presentation of Basic Science and Technology in the FCT, Abuja;
3. determine the perceptions of quality assurance personnel on teachers' classroom management in the FCT, Abuja;
4. determine the perceptions of quality assurance personnel on students' classroom activities in the FCT, Abuja; and
5. determine the perceptions of quality assurance personnel on students' performance in the

FCT, Abuja.

Research Questions

The following research questions guided the study:

1. What are the perceptions of quality assurance personnel on teachers' lesson preparation to teach Basic Science and Technology in the FCT, Abuja?
2. What are the perceptions of quality assurance personnel on teachers' lesson presentation of Basic Science and Technology in the FCT, Abuja?
3. What are the perceptions of quality assurance personnel on teachers' classroom management in the FCT, Abuja?
4. What are the perceptions of quality assurance personnel on students' classroom activities in the FCT, Abuja?
6. What are the perceptions of quality assurance personnel on students' performance in the FCT, Abuja?

Research Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H_{01}: There is no significant difference in the perceptions of quality assurance personnel on teachers' lesson preparation to teach Basic Science and Technology in the FCT, Abuja on the basis of gender.

H_{02}: There is no significant difference in the perceptions of quality assurance personnel on teachers' lesson presentation of Basic Science and Technology in the FCT, Abuja on the basis of rural and urban school location.

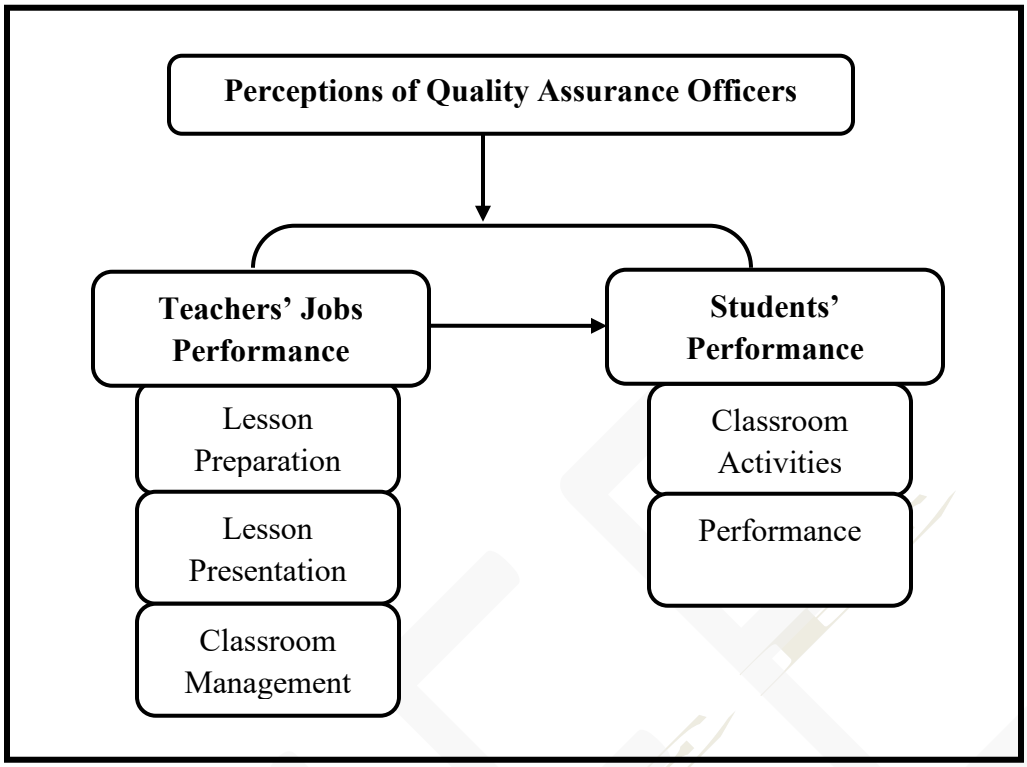
H_{03}: There is no significant difference in the perceptions of quality assurance personnel on teachers' classroom management in the FCT, Abuja on the basis of years of experience.

H_{04}: There is no significant difference in the perceptions of quality assurance personnel on students' classroom activities in the FCT, Abuja on the basis of number of schools monitored annually.

H_{05}: There is no significant difference in the perceptions of quality assurance personnel on students' performance in the FCT, Abuja on the basis of rural and urban school location.

Conceptual Framework

The conceptual framework of the study presents Basic Science and Technology instructional quality as a multidimensional process involving teacher inputs and instructional processes that culminate in student-related outcomes.



Quality assurance personnel serve as evaluators of these dimensions because their monitoring responsibilities place them in a position to assess the extent to which classroom practices and learning outcomes conform to expected standards. Teachers' lesson preparation represents the foundational readiness for instruction and includes subject-matter knowledge, understanding of the curriculum, pedagogical competence, use of instructional materials and planning for practical activities. Lesson presentation reflects teachers' ability to communicate content clearly, structure lessons logically, state learning objectives, use appropriate questioning techniques and involve learners in instruction. Classroom management concerns the ability to maintain discipline, manage instructional time, build productive relationships, handle conflicts and create a positive and inclusive environment for learning. Students' classroom activities represent the observable level of learner participation in group work, practical activities, use of learning materials, collaborative learning, creativity, critical thinking, listening, cooperation and independent initiative. Students' performance represents the perceived academic outcome of the instructional process and includes comprehension, examination performance, practical competence, problem-solving, critical thinking and improvement over time. The framework further recognizes that quality assurance judgments may be influenced by contextual and personal characteristics. These include gender, school location, years of experience, academic qualification and the number of schools monitored annually. Together, the teacher-related and student-related indicators provide an overall picture of the perceived quality of Basic Science and Technology in junior secondary schools in the FCT.

Empirical Review

Madumere-Obike, Okeke and Nwabueze (2013) examined the role of quality assurance in enhancing learning and students' performance in secondary schools in South-East Nigeria using a

descriptive survey design. The study involved a large sample of secondary school teachers and found that infrastructural facilities, quality teaching and school climate supported students' academic performance. The authors associated these outcomes with effective quality assurance activities and recommended continuous professional development for teachers and stronger school climates. Mwaura (2014) investigated the role of quality assurance and standards officers in promoting education in private secondary schools in Limuru District, Kiambu County, Kenya. The study employed a descriptive survey design and collected data through questionnaires and interviews. It found that quality assurance supervision positively influenced staff development and helped principals and teachers perform their duties more effectively. The study also identified monitoring of academic performance, curriculum delivery and assessment as important quality assurance activities. Waseka, Simatwa and Okwach (2016) investigated the influence of teacher factors on students' academic performance in Kakamega County, Kenya, using ex-post-facto and correlational designs. Their findings showed that teacher-related factors accounted for a substantial proportion of variation in students' performance, with some teacher qualifications and characteristics significantly predicting academic outcomes. The study reinforced the importance of teacher quality in explaining student performance. Obilor (2019) examined teacher-related factors influencing students' academic performance in public secondary schools in Rivers State, Nigeria. Using a descriptive survey design, the study reported strengths in teachers' communication skills but weaknesses in areas such as assignment administration, commitment and teacher-student interaction. The study concluded that teacher-related practices have important implications for students' academic outcomes. Muchanje (2020) explored teachers' attitudes toward quality assurance and standards officers in primary schools in Embu County, Kenya. The descriptive survey study found no significant gender difference in attitudes toward quality assurance personnel, but it reported a significant difference associated with teaching experience. The findings are relevant to the present study because they suggest that experience may shape perceptions of quality assurance processes. Mganga and Lekule (2021) assessed the impact of quality assurance officers' activities on the teaching and learning process in selected secondary schools in Tanzania using a mixed-method approach. The study found that quality assurance activities contributed to teacher confidence, professional growth, discipline, creativity and innovation. The authors emphasized the need for government and policymakers to strengthen the capacity of personnel involved in quality assurance.Rikichi, Bulus and Kwasau (2022) examined supervision and inspection as quality assurance strategies in the administration of primary education in North-West Nigeria. The cross-sectional study found a significant impact of supervision on teachers' instructional delivery and a significant impact of inspection on the provision of instructional materials. It recommended regular supervision and inspection to maintain instructional standards. Agapiti and Kitula (2022) assessed the contribution of school quality assurance supervisory roles to teachers' efficacy in public secondary schools in Monduli District, Tanzania. Using a convergent mixed-method design, the study found that school quality assurance supervision directly influenced teachers' efficacy and recommended stronger policy emphasis on supervisory roles. Tuyisabe, Mandila and Gadi (2022) examined quality assurance officers' classroom observation and its role in improving performance in the Certificate of Secondary Education Examination in Mwanga District, Tanzania. Findings indicated that quality assurance officers assessed content delivery, teaching and learning methods, instructional documents and teachers' preparation. The study recommended frequent school visits, respectful communication and regular follow-up to ensure implementation of feedback.

Eziamaka, Manafa and Iheanacho (2022) examined the influence of quality assurance measures on teachers' job performance in public secondary schools in Anambra State, Nigeria. The descriptive survey study found a positive and strong relationship between quality assurance measures and teachers' job performance. It recommended regular capacity development, seminars, workshops and support for instructional materials.

Makiya, Mnyanyi and Ngirwa (2022) investigated school quality assurance strategies and learning achievement among public primary schools in Arusha Region, Tanzania. Using interviews, questionnaires and quantitative and qualitative analyses, the study found that regular school visits, follow-up visits, timely feedback, supportive communication and professional development enhanced learning achievement. Constraints included inadequate funding, transport and shortages of quality assurance personnel. Sululu, Ochieng and Kirwok (2023) examined the contribution of quality assurance and standards officers to Kenya Certificate of Secondary Education performance in Kwanza Sub-County. The descriptive survey study found that quality assurance officers contributed to staff growth, educational resources, curriculum implementation and feedback. It recommended more frequent monitoring and systematic follow-up of recommendations.

Research Gap

The empirical studies reviewed confirm the importance of quality assurance, teacher effectiveness and instructional supervision across different educational contexts. However, the reviewed studies were conducted largely outside the FCT or focused on general school quality assurance, administrative processes, teacher efficacy, curriculum implementation or broad student performance. None of the reviewed studies simultaneously examined quality assurance personnel's perceptions of teachers' lesson preparation, lesson presentation and classroom management together with students' classroom activities and academic performance specifically in Basic Science and Technology in junior secondary schools in the Federal Capital Territory, Abuja. The present study was designed to fill this contextual and subject-specific gap.

Methodology

The study adopted a descriptive survey research design. The design was appropriate because the study sought to obtain and analyze perceptions concerning existing teaching and learning practices without manipulating the variables. The approach enabled the researcher to collect factual information from a relatively large population through a structured questionnaire and to analyze the data using descriptive and inferential statistics (Fowler, 2014). The population comprised 617 educational personnel across the six Area Councils of the Federal Capital Territory, Abuja. The population consisted of 161 principals, 322 vice-principals and 134 quality assurance officers. A sample size of 357 respondents, comprising 80 principals, 169 vice-principals and 108 quality assurance officers, was selected using the Research Advisors sample-size table. Simple random sampling was used in selecting schools and respondents.

Data were collected using the Perception of Quality Assurance Officers on Teachers' Job and Students' Performance Scale (PQAOTSPS). The instrument consisted of two sections. Section A elicited demographic information, while Section B contained items addressing teachers' lesson preparation, lesson presentation and classroom management, as well as students' classroom activities and performance. Responses were structured on a four-point scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1).

The instrument was validated by three experts from the Department of Science and Environmental Education, Faculty of Education, University of Abuja, together with an education-sector expert.

Their comments were used to refine the questionnaire. Reliability was established through a pilot study involving 45 educational personnel who were excluded from the main study. Cronbach's alpha analysis yielded a reliability coefficient of 0.77, indicating satisfactory internal consistency. Following questionnaire administration, 343 properly completed responses were available for analysis, representing a 96.08% response rate. Descriptive statistics comprising frequency, percentage, mean and standard deviation were used to address the research questions. The independent-samples t-test and one-way analysis of variance (ANOVA) were used to test the hypotheses at the 0.05 level of significance.

Data Analysis and Results

Answers to the Research Questions

Table 1. Summary of perceptions of teachers' instructional practices and students' outcomes

Dimension	N	Mean	SD	Interpretation
Teachers' lesson preparation	343	2.90	0.99	Favourable
Teachers' lesson presentation	343	2.97	0.97	Favourable
Teachers' classroom management	343	3.03	0.95	Favourable
Students' classroom activities	343	2.77	1.02	Moderate
Students' academic performance	343	2.82	0.93	Moderate

The results show that teacher-related indicators received comparatively favourable ratings. Teachers' classroom management recorded the highest overall mean (M = 3.03, SD = 0.95), followed by lesson presentation (M = 2.97, SD = 0.97) and lesson preparation (M = 2.90, SD = 0.99). Students' classroom activities recorded a lower mean (M = 2.77, SD = 1.02), indicating moderate engagement, while students' academic performance was also perceived at a moderate level (M = 2.82, SD = 0.93). The findings indicate that respondents viewed teachers more positively than the resulting level of student engagement and performance.

Tests of Hypotheses

Table 2. Summary of Inferential Results

Hypothesis/Comparison	Statistical Test	Statistic	p-value	Decision
Gender and lesson preparation	Independent samples t-test	t(341) = 1.19	0.233	Not significant
School location and lesson presentation	Independent samples t-test	t(341) = 18.08	0.001	Significant
Years of experience and classroom management	One-way ANOVA	F(3,339) = 4.40	0.005	Significant
Schools monitored and student activities	One-way ANOVA	F(3,339) = 0.851	0.467	Not significant
School location and student performance	Independent samples t-test	t(341) = 14.18	0.001	Significant

Hypothesis One showed no statistically significant gender difference in perceptions of teachers' lesson preparation, t(341) = 1.19, p = .233. Male respondents (M = 23.34, SD = 3.03) and female respondents (M = 22.95, SD = 2.94) had similar mean scores; therefore, the null hypothesis was not rejected.

Hypothesis Two revealed a statistically significant difference in perceptions of teachers' lesson presentation according to school location, t(341) = 18.08, p < .001. Rural-school ratings (M =

25.39, SD = 1.88) were higher than urban-school ratings (M = 21.44, SD = 2.14); therefore, the null hypothesis was rejected.

Hypothesis Three revealed a statistically significant difference in perceptions of teachers' classroom management based on years of experience, F(3,339) = 4.40, p = .005. Tukey post-hoc analysis showed that respondents with more than 15 years of experience gave significantly higher ratings than those with 1–5 years of experience (mean difference = 1.50, p = .012) and those with 6–10 years of experience (mean difference = 1.46, p = .012).

Hypothesis Four indicated no statistically significant difference in perceptions of students' classroom activities according to the number of schools monitored annually, F(3,339) = 0.851, p = .467. The null hypothesis was therefore not rejected.

Hypothesis Five showed a statistically significant difference in perceptions of students' performance according to school location, t(341) = 14.18, p = .001. Rural-school ratings (M = 23.84, SD = 1.97) were higher than urban-school ratings (M = 20.63, SD = 2.18). The null hypothesis was therefore rejected. This interpretation follows the reported test statistic and p-value.

Discussion of Findings

The study revealed a clear pattern: teachers were generally perceived positively in the three instructional dimensions examined, whereas students' classroom engagement and academic performance were perceived only moderately. This difference is important because it suggests that professional competence in lesson preparation, presentation and classroom management may not automatically translate into optimal student engagement and higher-order learning outcomes.

The favourable perception of teachers' lesson preparation indicates that respondents generally considered Basic Science and Technology teachers adequately prepared for their instructional responsibilities. This finding agrees with Waseka, Simatwa and Okwach (2016), who demonstrated the relevance of teacher factors to students' academic performance, and with Obilor (2019), who emphasized the contribution of teacher-related practices to educational outcomes. Adequate planning is especially important in science because meaningful instruction requires the coordination of curriculum objectives, practical activities, instructional resources and assessment.

Teachers' lesson presentation was also rated favourably. Respondents perceived teachers as capable of structuring lessons logically, communicating objectives and using instructional techniques that supported learning. This finding is consistent with Makiya, Mnyanyi and Ngirwa (2022), who showed that school quality assurance strategies can support instructional practice, and with Tuyisabe, Mandila and Gadi (2022), who found that quality assurance classroom observations addressed content delivery, teaching methods and preparation for instruction.

Classroom management recorded the highest teacher-related rating. Respondents therefore generally viewed teachers as competent in maintaining order and creating environments conducive to learning. This finding is compatible with Mganga and Lekule (2021), whose study associated quality assurance activities with improved teacher confidence, discipline and professional growth. The significant difference associated with years of experience also suggests that evaluators' professional backgrounds may shape how classroom-management practices are judged.

Despite the positive assessment of teachers, students' classroom engagement remained moderate. Students participated in collaborative and practical activities, but creativity, critical thinking and independent initiative were less strongly demonstrated. This finding is particularly important for Basic Science and Technology, where meaningful learning requires students to observe, investigate, manipulate materials, generate explanations and solve problems rather than merely receive information.

Students' academic performance was also rated at a moderate level. Although students were perceived as reasonably competent in comprehension and conventional examinations, critical thinking and problem-solving were identified as weaker areas. The result suggests a possible gap between apparently satisfactory instructional processes and the development of higher-order cognitive outcomes. Quality assurance practice should therefore extend beyond checking teacher documentation and classroom order to examining the intellectual quality of students' learning activities.

The significant school-location differences in lesson-presentation and student-performance ratings should be interpreted cautiously. The findings indicate differences in respondents' perceptions rather than direct evidence that one school location objectively outperformed the other. The study did not independently compare standardized achievement scores or experimentally determine the factors responsible for the location differences. Future studies should therefore combine perception data with direct achievement evidence and classroom observation.

Conclusion

The study concludes that Basic Science and Technology teachers in junior secondary schools in the Federal Capital Territory, Abuja are generally perceived as professionally prepared, competent in lesson presentation and effective in classroom management. Teachers were viewed as demonstrating confidence, organization and commitment to instructional responsibilities. However, these favourable perceptions were not matched by equally strong perceptions of student engagement and academic performance. Students' participation and performance remained moderate, particularly in areas involving creativity, critical thinking, initiative and problem-solving. The findings therefore suggest that quality improvement in Basic Science and Technology should move beyond teacher preparedness and orderly classroom processes to place greater emphasis on what students actually do intellectually during instruction.

Recommendations

In line with the findings of the study, the following recommendations were submitted:

1. The FCT Universal Basic Education Board and school authorities should provide functional laboratories, practical materials, teaching aids and appropriate digital tools to support interactive Basic Science and Technology instruction.
2. Continuous professional development should emphasize inquiry-based teaching, project-based learning, creativity, critical thinking, problem-solving and effective integration of practical science activities.
3. Quality assurance evaluation frameworks should assess student cognitive engagement more explicitly by including indicators of questioning, investigation, collaboration, reasoning and application of scientific knowledge.
4. Curriculum implementation should provide greater opportunities for open-ended investigations, locally relevant scientific problems, design challenges, STEM projects and collaborative experimentation.
5. Assessment practices should extend beyond recall-oriented examinations to include practical tasks and activities that measure application, reasoning, creativity and problem-solving abilities.

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