ISRG Journal of Arts, Humanities and Social Sciences (ISRGJAHSS)

ISRG PUBLISHERS
Abbreviated Key Title: ISRG J Arts Humanit Soc Sci
**ISSN: 2583-7672 (Online)**
Journal homepage: https://isrgpublishers.com/isrgjahss
Volume – III Issue -III (May-June) 2025
Frequency: Bimonthly


# Impact of Teachers' Quality, Experience and Content Knowledge and Students' Mathematics Achievement in Secondary Schools.

**Efayena, Trustee.**

Institute of Education Delta State University, Abrake. Nigeria.

| **Received:** 21.05.2025 | **Accepted:** 27.05.2025 | **Published:** 31.05.2025

*__Corresponding author:__ Efayena, Trustee.
Institute of Education Delta State University, Abrake. Nigeria.

## Abstract

*The study looked into how students' mathematics achievement was impacted by the quality, experience, and subject-matter expertise of teachers. The correlation method's ex-post-factor design was used in this investigation. All of the public secondary schools in Delta State, Nigeria's Okpe Local Government Area made up the study's population. The sample size consisted of three hundred (300) teachers selected from thirteen (13) schools. Two tools were employed to gather the data. These were the third-term mathematics results for the 2023–2024 school year and the Teacher Quality, Experience, and Content Knowledge Questionnaire. Both content and face validation were applied to the instrument. The dependability of the questionnaire instrument was tested using Cronbach's alpha, which produced a reliability coefficient of 0.71. Since the scores were gotten from the original score sheet, the achievement outcomes did not need to be tested for reliability. Coefficient of determination was used to answer the research questions, and linear regression was used to test the hypotheses at the 0.05 level of significance. The results showed that students' mathematics performance in Delta State's Okpe Local Government Area was positively correlated with the calibre, experience, and subject-matter expertise of the teachers. The results also demonstrated a statistically significant correlation between learners' mathematical achievement and the calibre and expertise of teachers. Therefore, it was suggested that school heads start mentorship programs that pair seasoned teachers with newcomers, prioritise ongoing professional development programs that improve teachers' quality and subject matter knowledge, and promote the use of evidence-based instructional methods that have been shown to increase students' engagement and learning.*

***Keywords:*** *Teachers' Quality, Teachers' Experience, Teachers' Content Knowledge, Students' Achievement, Mathematics*


**DOI: 10.5281/zenodo.15558946**

## Introduction

One of the most important subjects taught in Nigerian secondary schools is mathematics. It is essential to the secondary education system in Nigeria because it helps pupils develop their analytical, critical thinking, and problem-solving abilities. It involves the exploration of numbers, quantities, shapes and patterns. The significance of teaching Mathematics in secondary school is emphasized by the National Policy on Education (FRN, 2013). The policy highlights the importance of raising the standard of mathematics education in schools and mandates that Mathematics be included as a core subject. Mathematics is required to be included in secondary school evaluations administered by the National Examination Council (NECO) and the West African Examinations Council (WAEC). Students consistently receive poor grades on external tests, like the West African Senior School Certificate Examination, despite mathematics' popularity and relevance. In table 1 below, an evaluation of students' performance over a six-year period showed an average of 64.27 credit pass in Mathematics.

**Table 1 Students Mathematics Performance in WAEC between 2016 and 2021**

| Year of Exam | No of Candidates Registered | No Passed (credit) | Percentage Passed |
|---|---|---|---|
| 2016 | 1,543,974 | 807,780 | 52.97 |
| 2017 | 1, 471,151, | 923,489 | 59.22 |
| 2018 | 1,572,396 | 786,016 | 49.98 |
| 2019 | 1,596,161 | 1,309,270 | 82.04 |
| 2020 | 1,456,272 | 1,003,668 | 65.24 |
| 2021 | 838,486 | 618,858 | 73.81 |
| **Total** | **8,478,895** | **5,449,081** | **64.27** |

**Source:** National Bureau of Statistics 2023

Table 1 above shows that within the six years period, a sum of 8,478,895 candidates registered for WAEC of which 5,449,081 representing 64.27% had credit pass in Mathematics. This situation calls for immediate actions targeted at remediating students' deficiencies in Mathematics, considering the fact that a credit pass in mathematics is a must for admission into Nigeria university as stipulated by National University Commission (NUC), the body responsible regulation of Nigeria university education.

According to recent research, a number of factors influence students' subpar academic achievement. These elements include the calibre, background, and subject-matter expertise of the teachers. The qualities, abilities, and expertise that a teacher possesses that increase his effectiveness in the classroom are defined as teacher quality. According to Darling-Hammond (2020), the main factor influencing students' success is the calibre of teachers. For learners to succeed academically, the teacher aspect is crucial (Efayena, 2025). According to a study by Ambusaidi and Yang (2019), math achievement in the eighth grade in Taiwan and Oman is positively correlated with the quality of the teachers. As a result, they advocated for more possibilities for participation in pedagogically and content-specific professional development and suggested that policy intervention be necessary to improve teacher quality. Also Susuoroka*et al*.,(2023) investigated the aspects of teacher quality as drivers of students' mathyematics achievement. Their research showed that students' mathematics performance is influenced by teachers' competence, instructional strategies, classroom management skills, motivation, satisfaction, and engagement.The quality of teachers has a major impact on pupils' mathematical achievement, according to additional research by Ojimba (2013) in Rivers State, Nigeria; Gichuru and Ongus (2016) in Gasabo District, Kigali City, Rwanda; and Ayeni and Jajua (2021) in Ondo State, Nigeria.It has been demonstrated that teachers' experience has a positive effect on pupils' mathematical proficiency.

According to research by Hanushek (2022), more experienced teachers typically have a favourable influence on their pupils' development. Experienced educators have a deep comprehension of the subject, are well-versed in effective teaching techniques, and have honed their classroom management methods. Ewetan and Ewetan (2015) investigated how instructors' prior teaching experiences affected the academic performance of Ogun State public secondary school pupils in the subjects of mathematics and English.They discovered that pupils' academic achievement in English and mathematics has been significantly influenced by the pedagogical experience of teachers. According to other research by Agbo-Egwu, Adadu, Nwokolo-Ojo, and Enaboifo (2017), Okoye and Tanimowo (2022), Sanni et al. (2021), and Bolarinwa et al. (2020), instructors' experience significantly raises pupils' math proficiency. From the aforementioned, educators who possess the necessary professional training, experience, communication skills, flexibility, and improvisation will undoubtedly generate exceptional pupils in any mathematics exam.

Studies repeatedly show that teachers' content expertise has a big impact on pupils' academic performance. Numerous studies have demonstrated a positive relationship between students' learning performance in a variety of subjects, such as language arts, science, mathematics, and content competence of the teachers (Darling-Hammond, 2016). According to Ball & Forzani(2019) there is a moderately significant positive association between students' mathematical achievement and the content competence of their teachers. It has been shown that teachers' content understanding is crucial to students' success in mathematics classes. According to research, teachers who possess a strong understanding of mathematical concepts and methods are better able to support learning of student and enhance mathematics performance. Student achievement in science education is predicted significantly by the content expertise of the teachers. Research indicated that teachers who have a deep understanding of scientific ideas and methods are better able to develop students' scientific literacy and critical thinking skills (Darling-Hammond, 2016). According to a study by Wilson et al. (2011), there is a significant effect size between the content knowledge of high school science teachers and students' scientific proficiency. Additional research, such as that conducted by Suharta and Parwati (2019), Odumosu et al. (2018), Kwateng (2019), Oasehinde-Williams et al. (2018), and Heather et al. (2015), demonstrated a strong relationship between students' academic success and instructors' proficiency in mathematics.These findings are in line with the educational production function literature, which highlighted the utilization of specific mathematical skills and knowledge in mathematics education. Therefore, policy guidance is needed to enhance kids' mathematics performance by advancing instructors' mathematical knowledge.


**DOI: 10.5281/zenodo.15558946**

**Statement of the Problem**

Most students in Nigeria secondary school run a significant risk of performing poorly on internal and external exams. Students' overall performance in the West African Senior School Certificate Examination (WASSCE) has declined, according to the WAEC Chief Examiner's report records from 2016 to 2021. Numerous factors, including as the calibre of teachers, their experience, their subject-matter expertise, etc., have been blamed for the students' poor performance in the WASSCE. One characteristic that distinguishes instructors and influences their professional practice is teacher quality.One characteristic that distinguishes instructors and influences their professional practice is teacher quality. As the primary curriculum implementer, the teacher should have the qualities necessary for both successful instruction and learning. Consequently, this study aims to address the question of how students' mathematical achievement and teachers' quality experience, and content understanding relate to one another. The study purpose is investigate the impact of teachers' quality, experience, content knowledge and students' academic achievement.

**Research Questions**

1. What is the relationship between teachers' quality and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria?
2. What is the relationship between teachers' experience and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria?
3. What is the relationship between teachers' content knowledge and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria?

**Hypotheses**

1. Significant relationship does not exist between teachers' quality and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria.
2. Significant relationship does not exist between teachers' experience and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria.
3. Significant relationship does not exist between teachers' content knowledge and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria.

## Methodology

This study uses correlation methods in an ex-post-factor design. Public secondary schools in Delta State, Nigeria's Okpe Local Government Area make up the study's population. 300 teachers made up the sample. Two tools were utilized to collect the data. These are the third-term students' mathematics results for the 2023–2024 school year and Teacher Quality questionnaire. Both content and face validation were applied to the instrument. There was no need to evaluate the achievement results for reliability because the scores were obtained from the original score sheet. The questionnaire instrument was tested for reliability applying Cronbach's alpha, which produced a reliability coefficient of 0.71. Research questions answered using coefficient of determination and hypotheses were tested deploying linear regression at 0.05 level of significance.

**Presentation of Results**

**Research Question 1:** What is the relationship between teachers' quality and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria?

**Table 2** Coefficient of Determination of the connection between Teachers' Quality and Students' Mathematics Achievement

| Variable | N | R | $R^2$ | $R^2$% | Decision |
|---|---|---|---|---|---|
| Teachers' Quality | | | | | |
| | 300 | 0.365 | 0,133 | 13.3 | Positive |
| Mathematics Achievement | | | | | |

Table 2 above indicates a correlation coefficient r-value of 0.365, revealing a low positive link between teachers' quality and Mathematics achievement of students. The investigation indicates that the coefficient of determination ($R^2$) corresponding to a correlation coefficient of 0.365 was 0.133. The coefficient of determination ($R^2$) of 0.133 indicates that teachers' quality contribute 13.3% of students' performance in Mathematics.

**Research Question 2:** What is the relationship between teachers' experience and students' Mathematics achievement Okpe Local Government Area of Delta State, Nigeria?

**Table 3**

Coefficient of Determination of the Relationship between Teachers' Experience and Students' Mathematics Achievement

| Variable | N | R | $R^2$ | $R^2$% | Decision |
|---|---|---|---|---|---|
| Teachers' Experience | | | | | |
| | 300 | 0.219 | 0,048 | 4.8 | Positive |
| Achievement in Mathematics | | | | | |

Table 3 above indicates a correlation coefficient r-value of 0.219, revealing a low positive link between teachers' quality and Mathematics achievement of students. The investigation shows that coefficient of determination ($R^2$) corresponding to a correlation coefficient of 0.219 was 0.048. The coefficient of determination ($R^2$) of 0.048 indicates that teachers' experience contribute 4.8% of students' performance in Mathematics.

**Research Questions 3:** What is the relationship between teachers' content knowledge and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria?

**Table 4**

Coefficient of Determination of the Relationship between Teachers' Experience and Students' Achievement in Mathematics

| Variable | N | R | $R^2$ | $R^2$% | Decision |
|---|---|---|---|---|---|
| Teachers' Content Knowledge | | | | | |
| | 300 | 0.495 | 0,245 | 24.5 | Positive |
| Mathematics Achievement | | | | | |


**DOI: 10.5281/zenodo.15558946**

Table 4 above indicates a connection coefficient r-value of 0.495, revealing a low positive link between teachers' quality and Mathematics achievement of students. The investigation indicates that the coefficient of determination ($R^2$) corresponding to a correlation coefficient of 0.495 was 0.245. The coefficient of determination ($R^2$) of 0.245 implies that teachers' experience contribute 24.5% of students' performance in Mathematics.

**Hypothesis 1:** Significant relationship does not exist between teachers' quality and students' Mathematics achievement in Okpe Local Government Area of Delta State, Nigeria.

**Table 5**
Regression Analysis on Relationship between Teachers' Quality and Students' Mathematics Achievement

| Model | Sum of Square | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 304.350 | 1 | 304.350 | 11.992 | .001 |
| Residual | 1979.637 | 298 | 25.380 | | |
| Total | 2283.988 | 299 | | | |

Table 5 demonstrates a substantial correlation between teachers' quality and Mathematics achievement of students, F(1,298) = 11.992, P(0.001) less than 0.001, at 0.05 significance level. Consequently, the hypothesis is not accepted, Thus, a substantial correlation exists between teachers' quality and students' Mathematics performance.

**Hypothesis 2:** Significant relationship does not exist between teachers' experience and students' mathematics achievement in Okpe Local Government Area of Delta State, Nigeria.

**Table 6**
Regression Analysis on Relationship between Teachers' Experience and Students' mathematics Achievement

| Model | Sum of Square | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 109,555 | 1 | 109,555 | 3.930 | .051 |
| Residual | 2174,432 | 298 | 27.877 | | |
| Total | 2283.988 | 299 | | | |

Table 6 demonstrates a substantial correlation between teachers' quality and Mathematics achievement of students, F(1,298) = 3.930, P(0.051) = 0.05, at a significance level of 0.05. Consequently, the hypothesis is rejected, Thus, a substantial correlation exists between teachers' experience and students' mathematics performance.

**Hypothesis 3:** Significant relationship does not exist between teachers' quality and students' mathematics achievement in Okpe Local Government Area of Delta State, Nigeria.

**Table 7**
Regression Analysis on Relationship between Teachers' Content Knowledge and Students' mathematics Achievement

| Model | Sum of Square | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 7536.393 | 1 | 7536.393 | 74.806 | 0.000 |
| Residual | 23272.259 | 298 | 100.746 | | |
| Total | 30808.652 | 299 | | | |

Table 7 demonstrates a substantial correlation between teachers' content understanding and Mathematics achievement of students, F(1,298) = 74.806, P(0.000) less than 0.05, at significance level of 0.05. Consequently, the hypothesis is not accepted, Thus, a substantial correlation exists between teachers' experience and students' Mathematics performance.

## Discussion of Results

Given that teachers' quality accounts for 13.3% of students' Mathematics performance i, the study indicateded a significant connection between teachers' quality and students' mathematical achievement. The outcomes also demonstrated a statistically significant connection between the teachers' quality and students' mathematical proficiency. This study results corroborate those of Ambusaidi and Yang (2019) and Susuoroka et al. (2023), who discovered a favourable relationship between quality of mathematics teachers and students' accomplishment. This demonstrates the calibre of teachers, which includes advanced degrees, training, and successful teaching strategies, in addition to the ability to better explain ideas is crucial for students success. This study's finding is also in sync with other studies by Ojimba (2013) in Rivers State, Nigeria; Gichuru and Ongus (2016) in Gasabo District, Kigali City, Rwanda; and Ayeni and Jajua (2021) in Ondo State, Nigeria, all support the idea that the calibre of teachers has a major influence on pupils' mathematical achievement. Additionally, skilled educators are more likely to engage in ongoing professional development, which guarantees they stay up to date on the best instructional practices.

Results indicated a strong link between students' mathematical achievement and the experience of teachers. Additionally, a statistically significant positive connection between students' mathematical achievement and teachers' experience is shown. According to the study, students' mathematics performance is influenced by teachers' experience 4.8% of the time. This supports the idea that more experienced educators typically have better classroom management and instructional strategies. The current study results collaborated with those of studies by Gichuru and Ongus (2016) and Ojimba (2013), which found a significant statistical relationship between students' mathematical performance and teachers' experience. According to studies by Agbo-Egwu, Adadu, Nwokolo-Ojo, and Enaboifo (2017), Okoye and Tanimowo (2022), Sanni, Mustapha, and Sojinu (2021), and Bolarinwa et al. (2020), students' performance in mathematics is significantly improved by the experience of their teachers. This entails that educators who possess the necessary professional training, experience, communication skills, flexibility, and improvisation will undoubtedly generate exceptional students in any mathematical test.

It has been demonstrated that teachers' content understanding is statistically significant and favourably connected with students' mathematical achievement. Thus, pupils' mathematics performance is greatly impacted by the content understanding of their teachers. The findings showed that students' mathematics performance is influenced by instructors' content understanding to the tune of 24.5%. It is implied that a teacher with strong subject-matter competence provides more thorough explanations and effectively responds to students' questions. The current is in line with those of Ayeni and Jajua (2021), who discovered a strong positive relationship between students' mathematical achievement and teachers' content understanding. The results of this study corroborate those of Suharta and Parwati (2019), Odumosu et al.


**DOI: 10.5281/zenodo.15558946**

(2018), Kwateng (2019), Oasehinde-Williams et al. (2018), and Heather et al. (2015), which demonstrated a strong relationship between students' academic success and teachers' proficiency in Mathematics.

## Conclusion

The aforementioned has demonstrated a association between the teachers' quality and students' mathematical performance, between teachers' experience and students' mathematical achievement, and between teachers' content understanding and students' mathematical outcomes. Thus, the results highlight how important these factors are in determining students' academic achievement, particularly in Mathematics. The study's findings are significant because they show that exceptional students will be produced by instructors who possess the necessary Quality, expertise, and material understanding.

**Recommendations**

From the study findings, the following recommendations are made.

1. School administrators should prioritize on-going professional development programmes that enhances teachers' quality and subject matter understanding.
2. School heads should initiate mentorship initiatives that pair experienced teachers with neophytes.
3. Schools should encourage the adoption of evidence-based instructional techniques which have proven to improve students' engagement and learning.

## References


1. Agbo-Egwu, A.O., Adadu, A,C., Nwokolo-Ojo, J., &Enaboifo, A.M.(2017). Teachers' teaching experience and students' academic performance in science, technology, engineering and mathematics (STEM) programmes in secondary schools in Benue State, Nigeria. *World Educators Forum, 9*(1), 1 – 17.
2. Ambusaidi, O.O. I., & Yang, Y, (2019). The impact of Mathematics teacher quality on student academic performance in Oman and Taiwan. *International Journal of Education and Learning, 1*(2), 50 – 62.
3. Ayeni, J.A., &Jajua, A.M. (2021). Teachers' quality and students' academic performance in secondary schools in Ondo North Senatorial District of Ondo State, Nigeria. *Journal of Liberal Arts and Humanities (JLAH). 2*(4), 19 - 32.
4. Ball, D.L., & Forzani, F.M. (2019). The work of teaching and the challenge for teacher education. *Journal of Teacher Education, 60*(5), 497 – 511.
5. Bolarinwa, D.A., Kolawole, A.O., Ayodele, O.V., Fakunle, A.F., &Adetule, O. (2020). Teachers' teaching experience and educational qualification as correlates of academic performance of students in public secondary schools in Ekiti State, Nigeria. *Journal of Education and Practice, 11*(2), 108 – 110.
6. Darling-Hammond, L. (2016). Constructing 21st– century teacher education. *Journal of Teacher Education. 57*(3), 300 – 314.
7. Efayena, T. (2025). Impact of teaches' gender on primary school learners' academic performance, character formation and general school routine administration in delta state, Nigeria. *UnijosJournal of Contemporary Studies in Education, 2*(1), 296 – 304.
8. Ewetan, O.T., &Ewetan O.O. (2015). Teachers' teaching experience and academic performance in Mathematics and English Language in public secondary schools in Ogun State, Nigeria. *International Journal of Humanities Social Sciences and Education (IJHSSE), 2*(2), 123 – 134.
9. Federal Republic of Nigeria. (2013*). National Policy on Education*. Nigerian Educational Research and Development Council.
10. Gichuru, E. &Ongus, A. (2016). Effects of teacher quality on student performance in Mathematics in primary 6 National Examination: A survey of private primary schools in Gasabo District, Kigali City, Rwanda. *International Journal of Education and Research, 4*(2), 237 – 260.
11. Hanushek, E.A. (2022). The trade-off between child quantity and quality. *Journal of Political Economy, 100*(1), 84 – 117.
12. Heather, C.H., Brain, R., & Deborah, L.B. (2015). Effects of teachers' mathematical knowledge for teaching on students' achievement. *American Educational Research Journal. 42*(2). 371 – 406.
13. Kwateng, J. (2019). The effects of teachers' content knowledge of Mathematics on grade 6 learners'' performance in South Africa. *American Journal of Humanities and Social Sciences Research (AJHSSR), 3*(11), 76 – 88.
14. National Bureau of Statistics. (2023). WAEC results statistics (2016 – 2021). https:/nigerianstat.gov.ng/elibrary/read/1241213?fbclid=IwAR3Wi9fo20ZMM0v5hgIE5AmLOPV6dc25vCRE88UFmY1wVawveWfNO-c-1E.
15. Odumosu, M.O., Olisama, O.V., &Areelu, F. (2018). Teachres' content and pedagogical knowledge on students' achievement in algebra. International *Journal of Education and Research, 6*(3), 83 – 94.
16. Ojimba, P. D. (2013). Teacher quality and senior secondary school students' achievement in Mathematics in Rivers State, Nigeria. *Educational Research International, 1*(3), 41 – 47.
17. Okoye, N. S., &Tanimowo, R. I. (2022). Teachers' experience and motivation as predictors of students' achievement and interest in Mathematics in Delta North Senatorial District, Nigeria. *International Journal of Research and Scientific Innovation (IJRSI), 9*(5), 22- 29.
18. Olasehinde-Williams, F., Yahaya, L., &Owolabi, H. (2018). Teachers' knowledge indices as predictors of secondary school students' academic achievement in Kwara State, Nigeria. *IAFOR Journal of Education, 6*(1), 73 – 90.
19. Sani, R., Mustapha, F., &Sojinu, O. S. (2021). Teachers'' teaching experience as correlate of senior secondary school students' performance in Mathematcs in Badagry Local Governmeny Area of Lagos State, *International Journal of Innovative Research and Advanced Studies (IJIRAS), 8*(9), 94 – 101.
20. Suharta, P. G., &Parwati, N. N. (2019). Relationship between teachers' content knowledge, pedagogical content knowledge, and self-efficacy and its impact on students' Mathematics learning achievement. *Advances in Social Science, Education and Humanities Research, 438*, 293 – 296.



**DOI: 10.5281/zenodo.15558946**

21. Susuoroka, G., Momori, O. I., &Padmore, A. E. (2023). Teacher quality factors as determinant of students' performance in Mathematics. *Journal of Education and Teaching Methods, 2*(3). 42 – 49.
22. Wilson, S. M., Floden, R. E., &Ferrini-Mundy, J. (2011). Teacher preparation research: Current knowledge, gaps, and recommendations. A research report prepared for the U. S. Department of Education.


**DOI: 10.5281/zenodo.15558946**