

Teachers Qualifications, Teaching Experience and Junior Secondary School Students Academic Achievement in Mathematics in Oyo Town, Nigeria

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ABSTRACT

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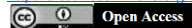
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Mathematics education is an essential element of contemporary education, significantly influencing cognitive development and future opportunities for individuals. The study investigated the effects of teachers' qualifications and teaching experience on junior secondary school students' academic achievement in Mathematics in Oyo town, Nigeria. The study adopted the pre-test and post-test quasi-experimental research design. Three hypotheses were tested. Eight hundred and fifty nine (859) JSS 2 students in Oyo town of Oyo state. Sample used was one hundred and twenty (120) students. Mathematics Teachers' Questionnaire (MTQ) and Mathematics Achievement Test (MAT) which was self-designed. The instruments were validated by experts. The reliability coefficient was established at 0.86 using Kuder Richardson 21. T-test and multiple regression analysis was used to analyse the data at 0.05 level of significance. The findings of this study revealed that there is significant difference in the achievement of JSS students taught by teachers with high qualification level and those taught by teachers with low qualification level ($t_{cal} = 10.72 > t_{tab} = 1.98$); there is significant difference in the achievement of JSS students taught by teachers with long time experience and students taught by teacher with short time experience ($t_{cal} = 5.11 > t_{tab} = 1.98$); and when teachers' qualifications and teaching experience were taken together, they jointly predict students' academic achievement ($F(2,118) = 47.975$; Adj $R^2 = 0.364$; $p < 0.05$). It was concluded that teacher's academic qualification only is not enough to positively affect student's achievement in Mathematics, but a professionally trained teacher who had acquired a pedagogical skills in teaching in a specified field of study. Based on the findings, it was recommended among others that State education boards and school administrators should ensure that mathematics is taught by teachers with at least B.Ed in Mathematics Education.

Keywords: Teacher's qualifications, Teaching experience, Mathematics, Students academic achievement and Junior secondary school students

Introduction

Mathematics is a core subject in most education systems because it builds logical reasoning, problem-solving, and analytical skills needed for STEM fields and everyday life. Mathematics achievement remains a central concern in education systems worldwide due to its role in developing logical reasoning, problem-solving, and readiness for STEM fields. Despite curricular reforms and increased investment in education, student performance in mathematics continues to be inconsistent across regions, with teacher-related factors identified as key determinants of learning outcomes. Among these factors, teachers' qualifications and teaching experience have received sustained attention in recent empirical research.

The education system of a nation cannot be greater than the quality of the teachers in that nation. A qualified teacher is one who holds a teaching certificate and/or licenced by the state' owns at least a bachelor's degree from a four-year institution and a well-qualified in his/her area of specialization (Musau & Abere, 2022).Teacher play crucial role in the teaching/learning process. The important role of teacher in the learning is unquestionable. Teachers have a lot of influence on their classroom practices.

Nwachuckwu (2024) observed that two categories of Mathematics teachers exist in Nigeria schools. The first group are the proper professionally trained Mathematics teachers who lack in-depth knowledge of the Mathematics content and the other group are those who have mastery of the subject but are not professionally trained teachers. The implication is that most practising Mathematics teachers do not possess adequate training for the job. Mathematics is a dynamic subject, this call for training and retraining of Mathematics teachers so as to update and upgrade their knowledge on the job and in the Mathematical contents in order to be able to effectively impact the knowledge on students. Since no educational system can rise above the level of its teachers (Clotfelter, et al. 2007).

Teacher qualification encompasses both academic credentials and professional training in pedagogy and subject content. Studies conducted between 2022 and 2024 indicate that teachers with subject-specific qualifications in mathematics exert a positive and statistically significant impact on student achievement (Olaleye, 2024). For instance, Njiru and Muthee (2023) found that 60% of mathematics teachers who were well-trained demonstrated greater competence in supporting learners with dyscalculia, which corresponded with improved mathematics outcomes in Mbeere South Sub County, Kenya. Similarly, research in Rwanda by Habarugira et al. (2023) revealed that teacher qualifications were significantly associated with mastery of mathematical content, classroom management, and the use of ICT skills, all of which positively influenced students' academic performance in mathematics. On an international scale, evidence from comparative studies shows that subject-specific qualifications account for approximately 17.5% of the variation in teacher effectiveness and contribute to measurable gains in student test scores.

Teaching experience is another critical variable linked to student achievement. Experience allows teachers to refine instructional strategies, anticipate student misconceptions, and manage classrooms more effectively. Quantitative analyses from 2023 demonstrate that teacher experience has a significant positive relationship with students' academic performance and satisfaction in mathematics. In Nigeria, Oghogho and Egharevba (2022) reported that teachers' years of experience were a significant positive predictor of students' academic achievement in mathematics, with a beta coefficient of 0.477 at $p < 0.05$. This aligns with broader findings suggesting that while the most substantial gains occur within the first five years of teaching, experience continues to contribute to student outcomes throughout a teacher's career.

Olaleye (2024) states that there were relationship between teacher characteristics and student's performance. According to Akinsolu (2010) the availability of qualified teachers determined the performance of students in school. Wirth and Perkins (2013) indicate that teacher attitude contribute significantly to student's attention in class, however Oghogho and Egharevba (2022) states that students' attitude was related to teacher characteristics. Explanation on good or poor students' academic performance have been quite exhaustive, yet controversy still exist among scholar as to what contribute singly or jointly to students' poor performance (Gravestock & Gregar-Greenleaf, 2008). Some of the teachers' characteristic found to be dominant in studies are related to; teacher's qualification, experience, attitude, and personality.

Theoretical support for these relationships is drawn from human capital theory and social cognitive theory. Human capital theory posits that investments in teacher education and training enhance instructional productivity, while social cognitive theory highlights how experienced teachers develop higher self-efficacy, which influences teaching behavior and student motivation. Empirical work using structural equation modeling further confirms that dimensions of teaching quality, such as reliability, responsiveness, assurance, and empathy, significantly predict mathematics achievement among undergraduate students (Darling-Hammond, 1998).

Despite these findings, gaps persist in understanding the relative contribution of qualifications versus experience in different educational contexts. Variations in teacher distribution, specialization mismatches, and access to professional development suggest that localized studies are necessary to inform policy on teacher recruitment, training, and retention. Therefore, this study therefore examined the effects of teacher's qualification on academic achievement of secondary school secondary students in mathematics in Oyo town, Oyo state, Nigeria.

Statement of the Problem

Despite the central role of mathematics in academic and technological development, students' achievement in the subject remains persistently low in many educational systems, particularly at the secondary school level. In Nigeria and other Sub-Saharan African countries, national examinations and international assessments consistently report poor performance in mathematics, with a significant proportion of students failing to attain the minimum credit pass required for further studies and career advancement. Research indicates that teacher-related factors are among the most influential determinants of student learning outcomes. Teachers' qualifications and teaching experience are often cited as critical components of instructional quality that directly affect students' understanding and performance in mathematics. However, empirical evidence on the extent of their influence remains inconsistent and context-dependent. This inconsistency is further compounded by challenges in many schools, such as the deployment of teachers outside their area of specialization, inadequate professional development, and unequal distribution of qualified and experienced teachers between urban and rural areas. Consequently, students are often taught by teachers who lack the requisite subject knowledge or pedagogical skills needed to effectively deliver mathematics instruction. Therefore, this study seeks to investigate the effects of teachers' qualifications and teaching experience on students' academic achievement in mathematics in Oyo Town and to provide empirical evidence that can guide educational policy and practice.

Purpose of the Study

The main purpose of the study is to determine the effects of teachers' qualification on academic achievement of secondary school secondary students in mathematics in Oyo town, Oyo state, Nigeria. Specifically, the study sought to determine if;

1. there is difference in the academic achievement of junior secondary students in Mathematics between those taught by teachers with high qualifications and those taught by teachers with low qualifications.
2. there is difference in the academic achievement of junior secondary students in Mathematics between those taught by trained teachers and those taught by untrained teachers
3. there is combine effects of teachers' qualification and teaching experiences on academic achievement of junior secondary students in Mathematics

Hypotheses

The following hypotheses were stated and tested at 0.05 level of significance

H₀₁: There is no significant difference in the academic achievement of Junior Secondary students in Mathematics between those taught by teachers with high qualification and those taught by teachers with low qualification

H₀₂: There is no significant difference in the academic achievement of Junior Secondary students in Mathematics between those taught by long time experienced teachers and those taught by short time experienced teachers.

H₀₃: There is no combine effects of teachers' qualification and teaching experiences on academic achievement of junior secondary students in Mathematics.

Methodology

The study adopted a quasi- experimental research design. The population for the study consisted of eight hundred and fifty nine (859) JSS 2 students in Oyo town of Oyo State that is made up of four local government areas with Fifty-one (51) secondary schools. The local government areas are Afijio, Oyo East, Oyo West and Atiba local Government Areas. A multi-stage procedure was used in sample selection. Firstly, one school was randomly selected from each of the local government areas to make four schools. Thirty (30) junior secondary school 2 (JSS 2) students were then randomly selected from each of the schools. JSS2 students were considered suitable for this study because they have spent a session in the school and are not preparing for any external examination. Also, they have been used to the teachers. Total sample used was one hundred and twenty (120) students. The students were subsequently divided into two groups, namely, group A and group B, that is, sixty (60) students in each of the groups. The teachers with less than ten (10) years of service are regarded as short time experienced teachers while those above ten (10) years are regarded as long time experienced teachers. Also, teacher with first degree and above are regarded as teachers with higher qualification while those with NCE are regarded as teachers with lower qualification. The classification was based on researchers' interest for the purpose of this study. Two research instruments were used in this study; Mathematics Teachers' Questionnaire (MTQ) which was developed by the researchers to elicit responses from Mathematics teachers. The questionnaire sought demographic information such as; age, sex, highest educational qualification, area of specialisation and length of years in service. This will enable the research to classify the teachers based on the aim of the study. The second instrument is Mathematics Achievement Test (MAT) which is also a self-designed. Four (4) mathematics teachers were selected. Two (2) teachers for each group based on the indices required for the study (experiences, qualifications and training). The MAT was made up of fifty (50) objective questions. The MAT was subjected to content and face validity to ensure its suitability by two senior lecturers in the department of Mathematics in Federal College of Education (Special), Oyo and an expert in the field of measurement and evaluation. The test was administered to thirty (30) students who have similar characteristics with the subjects of this study but did not form part of the study sample. Fifty (50) items with the largest item-total correlation were retained in the final version of MAT. The reliability was estimated using KR-20 to the score obtained from thirty (30) JSS II students. The reliability was found to be high ($r = 0.86$) and the average item difficulty index was 0.48. The permission of the principals of the selected schools were sought and got approval before the study was carried out. The consent of the respondents were also sought.

Pre-test was administered before the selected topics were taught for eight weeks. The Post-test was then administered at the end of the eight weeks. The pre-test and post-test scripts were collected and sorted out according to the category of teacher. The data collected was analysed using t-test and multiple regression analysis to draw the inferences at 0.05 level of significance.

Results

The results were arranged based on the stated hypotheses as follows;

H₀₁: There is no significant difference in the academic achievement of Junior Secondary students in Mathematics between those taught by teachers with high qualification and those taught by teachers with low qualification

Table 1: t-test analysis of Teacher's qualification levels and students' academic achievement in Mathematics

Variables	N	$\bar{x}$	df	Tcal	ttab	Remark
High Qualification Level	60	38.00	119	10.72	1.98	significant
Low Qualification Level	60	201.42				

Significant at $p > 0.05$.

From Table 1 above, the result shows the achievement of JSS students in Mathematics taught by teachers with high qualification and those students taught by teachers with low qualification level. From the table, the t-cal (10.72) is greater than the t-table value (1.98). This means that there is significant difference in the achievement of JSS students taught by teachers with high qualification level and those taught by teachers with low qualification level. Hence the null hypothesis is rejected.

H₀₂: There is no significant difference in the academic achievement of Junior Secondary students in Mathematics between those taught by long time experienced teachers and those taught by short time experienced teachers.

Table 2: t-test analysis of teacher's years of teaching experience and students' academic achievement in Mathematics

Variables	N	$\bar{x}$	Df	tcal	ttab	Remark
Long Time Experience	60	45.20	119	5.11	1.98	Significant
Short Time Experience	60	31.22				

Significant at $p > 0.05$

The findings in Table 2 revealed that there is significant difference in the achievement of JSS students taught by teachers with long time experience and students taught by teacher with short time experience because the t-cal ((5.11) is greater than t-table value (1.98). The null hypothesis is therefore rejected.

H₀₃: There is no combine effects of teachers' qualification and teaching experiences on academic achievement of junior secondary students in Mathematics

Table 3: Summary of Multiple Regression Analysis Showing the combine effects of teachers' qualification and teaching experiences on academic achievement of junior secondary students in Mathematics

Sources of Variance	Sum of Square	df	Mean square	F	Significant
Regression	1120.117	2	560.059	47.975	0.000
Residue	1377.475	118			
Total	2497.592	120			
R = 0.503 ^a					
R Square = 0.364					
Adjusted R Square = 0.362					
Std. Error of the Estimate = 2.143					

a. Dependent Variable: students' academic achievement

b. Predictors: (Constant), teachers' qualification and teaching experiences

The table 3 indicated that the combine effects of teachers' qualification and teaching experiences on academic achievement of junior secondary students in Mathematics in Oyo town ($F_{(2,118)} = 47.975$; $\text{Adj } R^2 = 0.364$; $p < 0.05$). This implies that when teachers' qualification and teaching experiences were taken together, they jointly predict junior secondary school students' academic achievement. The table further revealed that multiple regression coefficient ($R = 0.703$) and multiple regression adjusted ($R^2 = 0.364$). This indicated that 49% of the variation in students' performance was accounted for by the combine contribution of teachers' qualification and teaching experiences while the remaining 64% is due to other factors and residuals not in this model.

Discussion

The findings of this study revealed that teacher qualification had a significant positive effect on students' academic achievement in mathematics. This suggests that teachers who possess relevant academic and professional training in mathematics education are better equipped to deliver instruction that enhances students' understanding and performance. The result aligns with Habarugira, Ndayambaje, and Uwamahoro (2023), who found that teacher qualifications were significantly associated with mastery of mathematical content, classroom management, and the application of ICT skills, all of which contributed to improved mathematics performance in Rwandan secondary schools. Similarly, Njiru and Muthee (2023) reported that well-trained mathematics teachers demonstrated greater competence in supporting learners with dyscalculia, leading to measurable gains in achievement in Mbeere South Sub County, Kenya. The theoretical basis for this outcome is drawn from human capital theory, which posits that investments in education and training increase an individual's productivity. In this case, teachers with subject-specific qualifications appear to translate their training into more effective instructional practices.

Teaching experience was also found to have a significant positive relationship with students' mathematics achievement. Teachers with moderate experience, particularly between 3 and 10 years, were associated with higher student scores compared to early-career and very senior teachers. This outcome supports the work of Oghogho and Egharevba (2022), who identified teaching experience as a significant predictor of students' achievement and interest in mathematics in Delta North Senatorial District, Nigeria. The finding is further corroborated by Numeron et al. (2023), whose regression analysis showed that teacher experience had a beta coefficient of 0.319 and was significant at $p < 0.002$, indicating its contribution to both academic performance and student satisfaction. From the perspective of social cognitive theory, experienced teachers develop higher self-efficacy, which influences their instructional choices, persistence, and ability to address student misconceptions. However, the diminishing returns observed beyond 10 years in this study suggest that experience alone is insufficient without continuous professional development, a point also emphasized by Van den Bergh, Ros, and Beijaard (2022).

When the relative contributions were compared, teaching experience demonstrated a slightly stronger predictive power than teacher qualification in the study context. This implies that while formal qualifications provide the foundational knowledge required for teaching mathematics, practical classroom exposure allows teachers to refine their strategies and respond more effectively to student needs. This pattern reflects findings in similar developing contexts where resource constraints and deployment practices limit the immediate impact of qualifications alone. The result contrasts with studies in high-resource settings, such as Wiswall (2022), where subject-specific qualifications accounted for a larger proportion of variance in student outcomes. The difference underscores the importance of context-specific evidence for informing teacher recruitment, deployment, and professional development policies.

Conclusion

This study examined the effects of teacher's qualification and teaching experience and students' achievement in Mathematics. It can be concluded from the result of the study that teacher's academic qualification only is not enough to positively affect student's achievement in Mathematics, but a professionally trained teacher who had acquired a pedagogical skills in teaching in a specified field of study. The study also revealed that experience played a significant role in teaching/learning process.

Recommendations

1. Based on the findings of this study, the following recommendations were made;
2. State education boards and school administrators should ensure that mathematics is taught by teachers with at least B.Ed in Mathematics Education.
3. Schools should pair teachers with 0-3 years of experience with experienced mentors for at least two academic sessions. The programme should focus on lesson planning, classroom management, and diagnostic teaching in Mathematics.
4. Ministries of education and schools should provide regular in-service training on modern instructional strategies, use of ICT in mathematics, and addressing learning difficulties.

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