

INFLUENCE OF TEACHER ADEQUACY ON STUDENT ACADEMIC ACHIEVEMENT IN PUBLIC SECONDARY SCHOOLS IN SOUTHWESTERN NIGERIA

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Abstract

This study investigated the influence of teacher adequacy (student-teacher ratio, teacher subject qualifications, and teacher professional development) on Student Academic Achievement (SAA) in public senior secondary schools in Southwestern Nigeria. The study used a correlational descriptive survey research design and adopted a multistage sampling procedure. Three states (Oyo, Ogun, and Ekiti), among the six in Southwestern Nigeria, were selected using a simple random sampling technique, with one Senatorial District (SD) from each state. The proportionate-to-size sampling technique was employed to select 40% of the local government areas in each SD, and 50% (101) of the schools within the selected local government areas were sampled. A class of 3,030 students from Public Senior Secondary School II was used; 202 mathematics and English language teachers and 202 heads of department were purposively sampled, and 101 school administrators were enumerated. The instruments used were teacher subject qualification and professional development questionnaires, as well as English and mathematics achievement tests. Data were analyzed using descriptive statistics and a t-test with a significance level of 0.05. The level of SAA was low, and the level of teacher adequacy was low against the threshold of 2.50. There was also a significant difference in SAA in schools where teachers were adequate compared to where they were not. The influence of the inadequacy of teachers on the SAA cannot be underestimated; hence, this variable should be given adequate attention by all concerned education stakeholders to improve the SAA.

Highlights of this study

❖ This study investigated the influence of teacher adequacy on student academic achievement in public senior secondary schools in Southwestern Nigeria.

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- ❖ The study analyzed the variable of teacher adequacy and its influence on student academic achievement beyond the numerical strength of teachers and the student-teacher ratio in the sampled schools; rather, the qualifications and access of teachers to professional development were considered.
- ❖ The study found that: 1) the level of academic achievement of most of the students sampled was low. 2) In terms of student-teacher ratio, teachers were inadequate in most of the sampled schools. 3) Meanwhile, most of the sampled teachers possessed the right academic qualifications and had access to opportunities for professional development on their jobs.

1. Introduction

Academic achievement (AA) measures performance outcomes that show how well a person or student has achieved particular objectives. These objectives are the kernels of activities in instructional contexts, particularly in secondary schools. Thus, AA is conceptualized as the knowledge acquired or skills developed in school subjects, typically measured by teacher-awarded test results or grades. Although there is no universal agreement on how it is best tested or which aspects are most important, Student Academic Achievement (SAA) is primarily identified by a set of statistical indicators that can be referred to as a student's level of accomplishment (in terms of numerical value) in an examination or test. This refers to how a student demonstrates their abilities during an examination or test. Student academic achievement can be measured in several ways, such as the outcome or result of an examination, assignment, classwork, and achievement tests given to students by their teachers.

Secondary education aims to prepare individuals for productive lives and higher education (Federal Republic of Nigeria, 2013). As a result, the significance of secondary education as a link between primary and tertiary education is that secondary schools are expected to provide quality education to all students who can benefit from it, expose students to become creative and critical thinkers, and provide them with opportunities to acquire reasonable skills, among other benefits. However, as laudable as the objectives of secondary education appear to be, there is evidence that their achievement has been severely jeopardized as a result of the low AA of the students at this level of education (Jaiyeoba & Salami, 2016).

Many senior secondary school graduates in Nigeria lack basic reading, writing, computing, and vocational skills that could improve their academic achievement in both internal and external examinations (Adeyinka, 2017; Attah & Adebayo, 2018; Oviawe, 2016). However, if the problem remains unaddressed, it could potentially limit students' chances of gaining admission into higher education institutions, jeopardize their job placement opportunities, and diminish their active participation in national growth and development. For instance, Table 1 shows the percentage of students in Southwestern Nigeria who earned at least five credits, including both English Language and Mathematics, from 2012 to 2021.

Table 1. The percentage of candidates who had a minimum of five credits, including English and mathematics, in the WASSCE from 2012 to 2021 in Southwestern Nigeria.

S/No	State	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	2018 (%)	2019 (%)	2020 (%)	2021 (%)
1.	Ekiti	33.56	33.34	33.80	37.75	54.3	71.83	56.81	64.18	65.43	67.43
2.	Lagos	55.72	56.03	45.86	37.27	63.0	65.50	60.72	50.41	62.16	64.41
3.	Ogun	38.81	39.92	38.92	39.67	52.8	54.14	51.69	32.89	56.31	63.89
4.	Ondo	32.40	32.12	32.40	35.45	64.8	44.27	52.21	44.45	64.34	65.45
5.	Osun	22.21	20.54	18.55	21.68	45.5	43.5	40.85	18.05	58.25	53.05
6.	Oyo	21.64	21.79	19.19	21.61	36.0	53.58	37.87	21.03	42.41	57.03

Sources:

- i. West African Examinations Council (WAEC), 2012-2015
- ii. National Bureau of Statistics (NBS): WAEC Results' Statistics: 2016-2018
- iii. West African Examinations Council (WAEC), 2019-2021

Table 1 indicates that the students' performance exceeded the average in only a few states during 2016, 2017, and 2018. One pertinent question that may agitate any concerned educational stakeholder is: what would be the fate of thousands of students who failed the examination as a result of their inability to obtain credit passes in both English Language and Mathematics, or either of the two subjects? Also, the WAEC rankings of the students' performance in the 36 states in Nigeria as of 2021 showed that none of the states in the Southwest (except Lagos, which maintained the 6th position) was on the list of first 1-10 (Ekiti, -11th; Lagos, 6th; Ogun -19th; Ondo, -13th; Osun, 29th and Oyo -26th). Another issue of concern is why the performance of the candidates could not be 70%, 80%, 90%, or even 100%? It is significant to note that some of the implications for this trend in the education of secondary school students are that the affected students may not be able to transition to a higher level of education due to their inability to obtain the requirements for such transition; they may drop out of the school system and eventually become misfits in the society by engaging themselves in untoward activities such as street begging, acts of hooliganism, pilfering, and substance abuse. All these would make the affected students unable to contribute to the national growth and development.

It has been observed from the available extant literature that previous studies have focused on investigating the difference or relationship between individual teacher variables and characteristics and SAA. Other studies have equally investigated the separate or combined contributions of teacher demographic variables (age and gender), teacher qualification (TQ), teacher attitude (TA), teacher workload (TW), teacher experience (TE), teacher professionalism (TP), teacher quality, and teacher adequacy (TAD) as a result of transfer, teacher deployment, teacher-pupil ratio, demand for and supply of teachers, teacher economic status, teacher communication skills, teacher classroom management, teacher work value, and teacher classroom attendance to SAA in both junior and senior secondary schools. However, none of the reviewed studies examined the impact of TAD on the AA of students, which includes the student-teacher ratio, subject qualifications of teachers, and the professional development of teachers.

Teachers employ various approaches to help learners improve their AA. They analyze, appraise, and create accommodations for students with learning challenges. They monitor students' work during classes, provide tutorials, grade assignments, and provide feedback. Furthermore, teachers assess the curriculum, educational materials, and programs as well as other educational activities to ensure that they are suitable for student learning. Hence, the influence of teacher adequacy on student academic achievement in public senior secondary schools in Southwestern Nigeria needs to be investigated.

The success of every educational program depends on the adequacy of its teachers. The adequacy of teachers, both in terms of quality and quantity, plays a crucial role in ensuring the production of quality education, thereby enhancing the SSA level. Conceptually, TAD is the number of teachers that can conveniently handle a given number of pupils or students. It is usually measured in terms of a ratio, i.e., student-teacher ratio, and sometimes the qualifications of teachers concerned are taken into cognizance. Having said that, the number of teachers in a particular school does not necessarily indicate their quality (Hazzan, 2015). This implies that TAD goes beyond merely looking at a particular school's student-teacher ratio. Meanwhile, the ratio of qualified teachers to students is critically important. In this sense, "qualified" connotes that the qualification(s), as well as the skills possessed by any of the available teachers, must be in tandem with the teaching subject(s) of the concerned teachers.

Furthermore, a teacher's qualification(s) could influence SAA. Abe and Adu (2014) found that teachers' qualifications can be quantified in three ways. These include education level, years of experience, pedagogy, certification in their areas of specialization, and continual professional development. Therefore, no matter how lofty the goals of any educational program are, the adequacy of its teachers is vital to its achievement. This implies that the number and quality of teachers present in a school could have a significant influence on the AA of learners at that school.

Similarly, one measure for evaluating the level of TAD is the Student-Teacher Ratio (STR), which is the number of learners assigned to a teacher for instruction. The quality of learning outcomes is often gauged by using the STR of a specific school. Smaller or moderately sized classes are more likely to enable teachers to pay attention to individual peculiarities in students, reduce the amount of lesson time needed to deal with disruptions, encourage thorough attention to the notes and exercises given to students, and contribute to the students' learning outcomes (Atanda, 2021). According to the National Policy on Education (Federal Republic of Nigeria, 2013), the average teacher-student ratio for senior secondary education should be 1:40.

Additionally, it is crucial to emphasize that when a teacher encounters an exceptionally high number of students, their workload will undoubtedly increase, potentially impacting their job performance. However, once the job performance is negatively affected, the ripple effect(s) of the teacher's heavy workload on the AA of the students would equally be inevitable. This implies that in schools where there are challenges of inadequate teachers, existing teachers would be saddled with high workloads in terms of teaching period and multi-subject workload. When this happens for a long time without intervention, it may lead to other problems, such as non-coverage of syllabi, low-quality teaching, and stress on the part of teachers, which could result in not only health challenges for the teachers but also poor AA of students (Atanda, 2021).

Nonetheless, as the STR depicts a teacher's workload at a specific level of education and aids in predicting the amount of teaching manpower required for an envisaged population of students, teacher professional development is a common practice in the teaching profession when there exists constant demand and avenues for educators to engage in continuous professional development to be acquainted with novel development in pedagogy and thereby improve the level of student academic achievement.

2. Statement of the problem

Several researchers have observed that many students in public senior secondary schools in Southwestern Nigeria continue to perform very poorly in both internal and external English language and mathematics examinations. Informal discussions among people and related research findings have invariably amplified that low student academic achievement in these subjects could be the result of the problem of teacher adequacy, which this study investigated. In addition to factors such as school location, school facilities, school resources, student attitudes, and teacher characteristics (demographic variables and experience), another variable, such as teacher adequacy, could have been the main influence on low student academic achievement in secondary schools in Southwestern Nigeria. This study examined the impact of teacher adequacy on the academic achievement of students in public secondary schools in Southwestern Nigeria. This study examined the academic achievement levels of students in English language and mathematics in public secondary schools in Southwestern Nigeria. It also assessed the adequacy of teachers in these schools while considering the student-teacher ratio, subject matter expertise, and professional development. Finally, the study assessed the influence of teacher adequacy on students' academic achievement in these public secondary schools and determined the difference between students' academic achievements in schools with adequate teachers and those with inadequate teachers.

3. Research Questions

The study posed and addressed the following research questions:

- I. What is the level of student academic achievement (in English Language and Mathematics) in public secondary schools in Southwestern Nigeria?
- ii. What is the level of adequacy (student-teacher ratio, teacher subject qualifications, and professional development) of teachers in public secondary schools in Southwestern Nigeria?

4. Hypothesis

The study formulated and tested the following hypothesis:

H₀₁: There is no significant difference between the student academic achievements in schools where teachers are adequate and where they are inadequate in public secondary schools in Southwestern Nigeria.

5. Significance of the Study

The findings of this study would be beneficial to school administrators, teachers, the government, educational planners, students, and researchers. The findings of this study will provide school administrators with information on subject areas where teachers are inadequate in schools. Similarly, the study's findings may reveal to the government, schools, and subject areas where there are no teachers or insufficient teaching staff. The government could also use the information to pinpoint subject areas in need of teachers. The STR could thus assist each state government in developing policies to address the challenges of teacher inadequacy. Other states within the federation could implement the recommendations of the study to address similar challenges. In other words, the study would allow policymakers and the government to seriously reconsider the implementation of the National Policy on Education (for teacher recruitment, adequacy, class size, and STR) to deliver a high-quality education that could improve student academic achievement. Moreover, information on the adequacy of teachers in schools could be useful to state ministries of education in each of the studied areas in identifying locations where teacher supplies are inadequate. Similarly, the findings could assist state education ministries in considering how to address any lopsidedness in teacher transfers. Educational planners could also benefit from the study's findings by receiving useful information (or data) about the current level of teacher adequacy in public secondary schools in Southwestern Nigeria. Thus, they could get familiar with the required information on how to ensure the improvement of the quality of secondary education in Southwestern Nigeria through the enhanced efficiency and effectiveness of the teaching staff in each of the schools. The study's findings highlight the primary aspects of teacher inadequacy, and students stand to gain significantly and achieve better academic results by making the necessary adjustments. In conclusion, the findings of the study could be of benefit to researchers. This is because the findings could provide essential information on which future researchers can build a template and conduct investigations into other aspects of teacher adequacy and their influence on student academic achievement, not only in secondary schools but also in other phases of education.

6. Literature Review

6.1. Teacher Adequacy and Student Academic Achievement

The adequacy, competence, personality, and passion of teachers have a significant influence not only on the quality of education but also on the academic achievement of students (Idiagbe, 2004). In the context of curriculum implementation, teacher adequacy cannot be assumed. Without addressing the issue, any form of implementation will undoubtedly fail. Achieving the goals for curriculum implementation or the realization of change depends on a better understanding of a teacher's adequacy and its development. Mbugua, Kibet, Muthaa, and Reche (2012) analyzed teacher adequacy and its influence on the academic achievement of students in secondary schools in Kenya. They investigated the adequacy and extent to which teaching and learning resources for mathematics are available and used for student academic achievement. An ex post facto research design was used in the study, with an observation schedule and mathematics teachers' and students' questionnaires used to collect data. This study included 661 form-three students and 71 mathematics teachers. The findings revealed

that most of the secondary schools were under-resourced in terms of teaching and learning resources for mathematics.

Similarly, Adegoke and Mefun (2016), in a study titled "Assessment of Availability and Adequacy of Human and Material Resources for the Implementation of the Nigeria New Senior Secondary School Mathematics Curriculum," carried out studies on the availability and adequacy of human and material resources to implement Nigeria's newly introduced mathematics curriculum. The study's sample comprised 110 senior secondary school mathematics teachers from Abakaliki and Ebonyi Local Government Areas in Ebonyi State, Nigeria. The "Mathematics Teachers Questionnaire (MTQ)" was used in this study. The study's findings revealed that successful curriculum implementation was based on the availability and adequate supply of human and material resources. The study also revealed that many of the sampled teachers were not proficient in mathematics, and several lacked the necessary teaching qualifications. Most of the sampled teachers were not members of professional bodies such as the Science Teachers Association of Nigeria and the Mathematical Association of Nigeria. Many schools lacked educational facilities and equipment. The findings of the study led to the formulation of recommendations.

Lyimo, Jackson, and Kipng (2017) examined the adequacy of teachers in Tanzanian community secondary schools because of widespread student failure. The study employed a descriptive research design and collected data using questionnaires, interview schedules, and formal documents. A simple random sampling technique was used to select 318 school stakeholders from the Arusha District. A pilot study was conducted with schools that were not included in the sample, and Cronbach's alpha was calculated to be 0.87. The researchers found that teachers' workloads were heavier, which hampered effective teaching and learning. The scarcity of science teachers was more critical than that of art teachers, so teachers did not have enough time to mark assignments and counsel students with learning difficulties. The government and policymakers should devise methods to address the issue of teacher inadequacy.

Finally, Musyoka, Cheloti, and Maithya (2018) investigated the influence of teacher adequacy on the academic performance of students in Kenya's Certificate of Secondary Education public schools. The study was anchored by the theory of the education production function, and a descriptive research design was used to guide the study. The study population included 30 principals and 270 heads of department (HODs) from 30 public secondary schools in Kathiani Sub-County. Meanwhile, 9 principals and 81 HODs were sampled from the target population using purposive and simple random sampling techniques, respectively. Questionnaires were used to obtain information from the principals and HODs. The Institute of Education experts evaluated the instruments' validity, and Cronbach's alpha determined their reliability. Quantitative data were analyzed using frequencies, percentages, means, and standard deviations, and the hypothesis was tested using correlation analyses at the 0.05 level of significance. The findings revealed that the students' academic performance was low, and teacher inadequacy was significantly influenced by the lack of immediate replacement of the transferred teachers from schools.

6.2. Student-Teacher Ratio and Student-Academic Achievement

The ratio of students to available teachers is one of the metrics used to gauge the adequacy of teachers in a school. Ajani and Akinyele (2014) conducted a study on the influence of the student-teacher ratio on the academic achievement of secondary school students in Port Harcourt, Nigeria. A descriptive survey research design guided this study, while a simple random sampling technique was used to choose three (3) senior secondary schools and 120 students (40 students in each school) in the Port Harcourt Local Government Area in Rivers State. Three research questions were raised to guide the study, and one hypothesis was developed. A self-developed questionnaire and the Mathematics Achievement Test were used as instruments to collect data. The research

questions were answered using descriptive statistics, and the hypothesis was analyzed using the Pearson Product-Moment Correlation coefficient at the 0.05 level of significance. The findings revealed that the relationship between students' perceptions of student-teacher ratios and their academic achievement in mathematics was significant. The study also revealed a significant relationship between teachers' years of experience and qualifications and students' academic achievement in mathematics.

Oluyinka, Magaji, Lawan, and Yunusa (2021) explored the Student-Teacher Ratio (STR) as a factor that could influence the academic achievement of students in mathematics in the Junior Secondary School Certificate Examination. The enrollment of students and teachers with students' performances in mathematics was the sample from four schools for four years. Two of the schools had an average STR of 50:1, with a performance average of 33% - 45% and a standard deviation of 11.21, whereas the other two had an average STR of 18:1, with a performance average of 60% - 77% and a standard deviation of 8.43. The research questions were answered, and the hypothesis was tested using statistical tools such as standard deviation and t-tests. The t-value was 0.0000517 at a significance level of 0.05 and a degree of freedom of 14, whereas the p-value was 0.999922. Findings from the study indicated a substantial difference in the STR and the mathematics performance of students. Additionally, the study recommended recruiting additional teachers to decrease the STR and enhance student academic achievement.

6.3. Subject Qualifications of Teachers and Student Academic Achievement

There has never been an agreement on which of the teacher variables influences student academic achievement the most. Ichazu and Omoregie (2020) investigated the impact of teachers' qualifications on students' academic achievement in Delta State secondary schools. A random sampling technique was used to sample 25 public secondary schools from 25 local government areas in Delta State. The study sample comprised 364 teachers, students, and secondary school principals. The study employed a survey design. Three questionnaires, namely the School Principal Questionnaire (SPQ), Teachers Qualifications Questionnaire (TCQ), and Students' Achievement Test (SAT), were used to collect data for the study. The Pearson Product-Moment Correlation (PPMC) and t-test were used to analyze the data. The findings revealed a considerable correlation between teachers' qualifications and students' academic achievement in secondary schools; secondary school students who were taught by qualified teachers outperformed those who were taught by unqualified teachers. Recommendations on how to develop secondary school teachers in Nigeria were made.

Similarly, Filgona and Sakiyo (2020) examined the relationship between the academic qualifications of teachers and the academic achievement of students in geography at senior secondary schools in Adamawa State, Nigeria. This study employed a predictive correlational research design. A multistage sampling technique was employed to select 400 teachers and 400 students from the state's senior secondary schools. Descriptive statistics were used to answer the study's research questions, while the inferential statistics of linear regression analysis were used to test the hypotheses raised. The research findings demonstrated a significant influence of teachers' qualifications on the academic achievement of learners. It was also discovered that the qualifications of teachers did not predict learners' attitudes toward geography. The findings highlighted the necessity for authorities to strictly select qualified graduate geography teachers to teach in senior secondary schools in Adamawa State.

In another study, Muhammad (2021) investigated the influence of teachers' academic qualifications and experience on students' academic achievement and interest in accounting at the Federal College of Education in Zaria, Nigeria. Two hundred and twenty (201) Nigerian Certificate of Education (NCE) II students and 10 accounting lecturers from the department were sampled. In addition, 140 NCE II students and seven (7) accounting lecturers from the Business Education Department were sampled via a simple random sampling technique. Two research hypotheses were tested using regression analysis and analysis of variance. Findings from

the study showed that the academic qualifications and expertise of instructors significantly influenced students' academic achievement in accounting.

6.4. Professional Development of Teachers and Student Academic Achievement

In most educationally developed countries, professional development is a standard practice. Teachers' continuous professional development becomes a requirement for educational systems dedicated to raising student achievement. Ogunbakin and Oshinyadi (2016) studied the influence of professional development and teacher preparation on the academic achievement of students in senior secondary schools in Ogun State, Nigeria. Purposeful and simple random sampling techniques were used to sample 1,250 students and 25 teachers, respectively. A checklist named the Teacher Preparation and Professional Development Checklist was used to collect data, along with the results of the students' academic performance on the Unified Examinations in Mathematics and English. Data were analyzed using correlation, one-way analysis of variance, and t-tests. The results revealed 1) a positive correlation between teacher preparation and students' academic performance ($r = .75$), 2) a positive correlation between teacher professional development and students' academic performance ($r = .40$), and 3) a significant influence of teacher education and preparation pathways on students' academic performance. It was suggested, among other things, that teachers be remunerated based on their academic qualifications.

Oluwole, Idikwu, Bawa, and Owobu (2017) conducted a study on the impact of teacher professional development on students' academic attainment in secondary schools in Benue and Nasarawa States in Nigeria. Two research questions were raised, and two hypotheses were developed. The study was anchored by a descriptive survey research design. Of the total population of 8,335 teachers from 709 secondary schools, 417 were randomly selected. The instrument used in collecting data was a 10-item structured questionnaire titled "Influence of Teachers' Professional Development Questionnaire." Descriptive statistics of mean and standard deviation were used to answer the research questions, while the chi-square (χ^2) test was used to test the hypotheses at the 0.5 level of significance. The findings from the study indicated that the participation of teachers in conferences and workshops has a considerable influence on the academic achievement of students. Therefore, the government should strive to allocate sufficient funds to sponsor instructors attending workshops and seminars.

Furthermore, in another study, Obineme (2020) investigated the impact of teacher professional development on teaching and learning in junior secondary schools in Anambra State, Nigeria. Four research questions were raised, and one hypothesis was developed. This study employed a descriptive survey as its research design. A sample size of 180 teachers was drawn from the population of 4,095 junior secondary school teachers using a multi-stage approach. A 20-item questionnaire was administered to the sample, and 158 responses were completed, returned, and used in the study. The acquired data were analyzed using arithmetic mean scores to answer the four research questions, and the hypothesis was tested using the t-test. The study results showed that: 1) teachers were well-versed in instructional material, teaching methods, evaluation, and classroom management; and 2) most teachers lacked ongoing professional development in these areas due to a lack of periodic retraining exercises. These findings recommended the need to sustain professional training of teachers.

From the reviewed literature, it could be inferred that none of the studies combined the indicators of teacher adequacy – teacher qualifications, student-teacher ratio, and teacher professional development in one study. Therefore, this study investigated the influence of teacher adequacy not only in terms of the available teachers' numerical strength but also considering the foregoing indicators.

7. Methodology

The study adopted a correlational descriptive survey research design. The multi-stage sampling approach was employed. Three states (Oyo, Ogun, and Ekiti) and one senatorial district (SD) from each of the six states in southwestern Nigeria were selected using a simple random sampling technique. Forty percent of the LGAs in each SD and fifty percent (101) of the schools in the sampled LGAs were chosen using the proportionate-to-size sampling technique. A class of 3,030 PSSS II was used; 202 mathematics and English language teachers, as well as 202 heads of department (101 each from science and arts), were purposively sampled, while 101 school administrators were enumerated. The instruments used were the Teacher Adequacy Inventory (TADI - $\alpha=0.84$); Teacher Subject Qualification (TSQ- $\alpha=0.78$); Teacher Professional Development (TPD - $\alpha=0.76$); English Language Achievement Test (ELAT; KR-20 = 7.47), and Mathematics Achievement Test (MAT; KR-20 = 7.46). Descriptive statistics and the t-test were used to analyze the data at the 0.05 level of significance. The instruments (MAT and ELAT) contain a set of demographic information such as the name of the school of the student, gender, age (which is categorized as below 13, 13-15, 16-18, 19-21, and above 22 years), and the categorization of the class as SS11 Commercial, Science, or Arts. The instruments comprise a multiple-choice objective test of 20 items, each with four options, ranging from A to D. Considering schools as the unit of analysis, the ELAT and MAT were scored dichotomously, and the results ranged from high (14-20 marks), medium (8-13), to low (0-7). Meanwhile, the level of teacher adequacy (in terms of subject qualifications of teachers and teachers' professional development) from teachers' perspectives was calibrated using the mean ranges of: 0.00 - 1.49 = Very Low; 1.50–2.49 = Low; 2.50–3.49 = High; 3.50–4.00 = Very High, while the level of teacher adequacy from school administrators' perspectives was gauged using the following metrics: average number of students: 1=Below 30, 2=31-40, 3=41-50, 4=51-60 and 5=Above 60, as well as Student-Teacher-Ratio (STR) benchmarks of Min: less than or equal to 40: 1 and Max: 50:1 (Federal Republic of Nigeria, 2013) item 41, page 15).

7.1. Research Design

This study employed a descriptive survey research design. A justification for choosing this research design was that the manifestations of the study's variables had already occurred, leaving no room for alteration. Hence, this study investigated the influence of teacher adequacy on the academic achievement of students in public secondary schools in Southwestern Nigeria.

7.2. Research Population

The study population comprised all school administrators, teachers, and SSS II students of 2791 state public senior secondary schools in Southwestern Nigeria. This geopolitical zone (Southwestern Nigeria) includes the states of Oyo, Ondo, Ogun, Osun, Ekiti, and Lagos.

7.3. Instruments

Five instruments were used to collect data on both the dependent and independent variables: English Language Achievement Test (ELAT), Mathematics Achievement Test (MAT), Teacher Adequacy Inventory (TAI), Teacher Subject Qualification Questionnaire (TSQQ), and Teacher Professional Development Questionnaire (TPDQ). Therefore, while ELAT and MAT were developed to elicit information on the dependent variable – Student Academic Achievement, TAI, TSQQ, and TPDQ were developed to collect information on the respondents' demographical characteristics, qualifications, years of experience, access to professional development, and the level of teacher adequacy in the sampled schools.

7.4. Validity and Reliability of the Instruments

The face, construct, and content validity of the instruments were evaluated by experts in the Faculty of Education at the University of Ibadan. Teachers who are English language and mathematics experts and have at least six (6) years of teaching experience in senior secondary schools were also consulted. Various recommendations, suggestions, and ideas from these experts were incorporated into the final draft of the instruments before

administration. To establish the instruments' reliability, they were administered to a group of respondents (school administrators, teachers, heads of department (HODs), and students) from 20 randomly selected secondary schools in Osun State that were not part of the sample. The Cronbach's alpha test of reliability was performed to assess the internal consistency of the instruments at a significance level of 0.05. Thus, TADI, TSQQ, and TPDQ yielded 0.84, 0.78, and 0.76, respectively. However, because the achievement tests ELAT and MAT had dichotomous items, Kuder Richardson 20 (KR-20) was employed to gauge their reliability, and the results yielded reliability coefficients of 7.47 and 7.46 for ELAT and MAT, respectively.

8. Results and Discussion

8.1. Research Question 1:

What is the level of student academic achievement (in English Language and Mathematics) in public secondary schools in Southwestern Nigeria?

Table 2. The level of student academic achievement in the English language.

Level	Range	Frequency	Percentage
High	14-20	911	30.1
Medium	8-13	1,006	33.2
Low	0-7	1,113	36.7
Total		3,030	100
Mean = 9.14			

Table 2 shows that most of the respondents, 1,113 (36.7%), have low English language achievement scores, 1,006 (33.2%) have medium achievement, and the remaining 911 (30.1%) have high achievement scores. Therefore, the mean achievement score of 9.14 in Table 2 indicates that the English language achievement is low.

Table 3. Level of student academic achievement in mathematics

Level	Range	Frequency	Percentage
High	14-20	823	27.2
Medium	8-13	798	26.3
Low	0-7	1,409	46.5
Total		3,030	100
Mean = 7.68			

Table 3 reveals that the majority of the respondents, 1,409 (46.5%), have low achievement scores in mathematics, 798 (26.3%) have medium achievement, and 823 (27.2%) have high achievement. Therefore, inferences could be made from the analyses in Table 3 (with a mean achievement score of 7.68) that the students' achievement in mathematics is low.

Table 4. Level of student academic achievement in the sampled secondary schools.

Level	Frequency	Percentage
High	867	28.61
Medium	902	29.77
Low	1,261	41.62
Total	3,030	100
Mean = 8.41		

Table 4 presents the results of student academic achievement (as measured by the Achievement Tests in English Language and Mathematics) converted into three levels using percentile rank. The results showed that 28.61% of the students scored above medium, 29.77% scored at medium, and 41.62% scored below medium. The results

indicate that the proportion of academically low students is higher than the proportion of higher achievers, as well as academically medium students. Therefore, it could be deduced that most of the students in the sampled schools (with a mean achievement score of 8.41) were academically low, especially in English language and mathematics.

8.2. Research Question 2:

What is the level of adequacy (student-teacher ratio, teacher subject qualifications, and professional development) of teachers in public secondary schools in Southwestern Nigeria?

Table 5. The level of teacher adequacy from the perspective of school administrators.

Variable	Mean	Std. Dev.
Number of English language teachers in the study	1.77	1.54
Number of Mathematics Teachers	1.86	1.54
Number of SS I classes	3.63	1.54
Number of SS II classes	3.65	1.58
Number of SS III Classes	3.46	1.62
Average number of students in SS I	3.83	1.21
Average number of students in SS II	3.61	1.20
Average number of students in SS III	3.56	1.20

Note: Average Number of Students: 1=Below 30, 2=31-40, 3=41-50, 4=51-60 & 5=Above 60

STR Benchmark: Min: 40: 1 (FRN, 2013, item 41, page 15)

Max: 50:1 (FRN, 2013, item 41, p. 15)

Table 5 presents the analysis results on the level of adequacy of English and mathematics teachers in the secondary schools. The results revealed that at most, each of the schools in the studied area had 2 teachers for English language (mean = 1.77, SD = 1.54) and mathematics (mean = 1.86, SD = 1.54). The results also showed that each school had at most 4 classes for SS I to SS III, totaling 12 classes in a school. The results further revealed that the average number of students in a class ranges from 51 to 60 students (category 4: 51-60 students). From the foregoing, it could be concluded that a school with 2 English Language and Mathematics teachers, each with an average of 12 classes and about 51-60 students in a class, cannot be said to have an adequate number of teachers. Therefore, it could be inferred that the level of teachers in the secondary schools in the studied areas was inadequate.

Table 6. Summary of the findings on the level of teacher adequacy from the perspective of school administrators.

Number of English Language and Mathematics Teachers in the School	Weighted Mean	1.81
Number of SSS classes	Weighted Mean	3.58
Average number of students	Weighted Mean	3.67

Note: 0.00 to 1.49 = Very Low; 1.50–2.49 = Low; 2.50–3.49 = high; 3.50–4.00 = very high

Table 6 summarizes the findings from the school administrators' perspectives. The average number of SSS classes (3.58) and students (3.67) has a higher weighted mean value than the average number of teachers (1.81) (Table 5). This implies a gross inadequacy in the number of English Language and Mathematics teachers who engage the students and their classes in most of the schools that were sampled.

Table 7. Level of teacher adequacy (in terms of teachers' subject qualifications and professional development) from teachers' perspectives.

ITEMS	SA	A	D	SD	Mean	Std. Dev.
The subject(s) I teach is/are related to what I studied at the institution of higher learning.	131 (64.9%)	42 (20.8%)	12 (5.9%)	17 (8.4%)	3.41	0.95
Teaching a subject that conforms to a teacher's qualifications positively affects students' academic achievement.	89 (44.1%)	55 (27.2%)	33 (16.3%)	25 (12.4%)	3.03	1.09
It is important to consider educational qualifications or a degree in education before employing a teacher.	116 (57.4%)	39 (19.3%)	19 (9.4%)	28 (13.9%)	3.21	1.11
Additional training is necessary at this level of my engagement with students	122 (60.4%)	47 (23.3%)	9 (4.5%)	24 (11.9%)	3.33	1.03
Teachers in my school are often allowed to take up further studies to enhance their knowledge of the teaching profession.	108 (53.5%)	50 (24.8%)	22 (10.9%)	22 (10.9%)	3.21	1.04

Weighted mean = 3.23

Standard mean = 2.50

Note: 0.00 to 1.49 = Very Low; 1.50–2.49 = Low; 2.50–3.49 = high; 3.50–4.00 = very high

Table 7 shows the results of the analysis on the level of teachers' adequacy in terms of subject qualifications of the sampled teachers and their opportunity for professional development. The results revealed that 85.7% of the respondents agreed that they teach subjects that relate to their qualifications, while 14.3% disagreed (mean = 3.41, SD = 0.95). Moreover, 71.3% of the respondents agreed that teaching a subject that relates to one's qualification positively affects student academic achievement, while 28.7% disagreed (mean = 3.03, SD = 1.09). Again, 76.7% of the respondents agreed that educational qualification is important during teachers' recruitment, while 23.3% disagreed (mean = 3.21, SD = 1.11). Moreover, 83.7% of the respondents agreed that taking additional training/degree is important, while 16.3% disagreed (mean = 3.33, SD = 1.03).

Moreover, 78.3% of the respondents agreed that their schools often allow them to take up further studies to enhance their knowledge and the teaching profession, while 21.7% disagreed. Generally, the analysis results showed that few teachers teach subjects that do not relate to their qualifications, and most of the teachers teach subjects that agree with their qualifications. To answer the research question on the level of adequacy of teachers

in public senior secondary schools in Southwestern Nigeria concerning teachers' perspectives, the weighted mean value for teachers' adequacy is 3.23, which is greater than the 2.5 criterion mean. This implies that even though teachers (English Language and Mathematics teachers) were grossly inadequate (in terms of their numerical strength) in most of the sampled schools, most of the available ones possess the right qualifications for the profession, and they equally have avenues for professional development.

Table 8. Level of teacher adequacy in terms of the sampled teachers' qualifications.

Educational Qualifications of Teachers	Frequency	Percentage
OND/HND	6	3.0
NCE	11	5.4
B.Sc./B.A	45	22.3
B.Ed.; B.Sc.(E.d),B.A(E.d)	95	47.0
M.Ed.	20	9.9
M.Sc./M.A	4	2.0
PGDE	20	9.9
Ph.D.	1	0.5

Note: - Ordinary national diploma (OND); Higher national diploma (HND); Nigerian certificate in education (NCE); Bachelor of Science (BSc); Bachelor of Arts (BA); Bachelor of Education (B.Ed.); Bachelor of Science Education (BSc (E.d); Bachelor of Arts Education (B.A(E. d); Master of Education (M.Ed.); Master of Arts (M.A.); Postgraduate Diploma in Education (PGDE); Doctor of Philosophy (Ph. D.).

Table 8 shows the teachers' educational qualifications (English Language and Mathematics teachers) in the schools sampled. Table 8 shows that 6 (3%) of the respondents possessed an Ordinary National Diploma and/or Higher National Diploma; 11 (5.4%) were NCE holders; 45 (22.5%) possessed either B.Sc. or B.A; 95 (47.0%) had their education degrees; 20 (9.9%) had their education Masters degrees; and 4 (2.0%) had their education Masters degrees. However, 20 (9.9%) of the respondents had a postgraduate diploma in education, and only 1 (0.5%) of the total respondents had a PhD. Table 8 shows that most of the sampled teachers (72.7%) possess adequate academic qualifications that are appreciably related to the field of education. In comparison, only a few (27.3%) hold qualifications in fields unrelated to education.

8.3. Hypothesis

There is no significant difference between student academic achievements in schools where teachers are adequate and where they are inadequate in public secondary schools in Southwestern Nigeria.

Table 9. Differences in academic achievement among students (in English and mathematics) based on teacher adequacy.

Variables	N	Mean	Std. deviation	df	t	P. value	Remark
Schools with adequate teachers	56	22.82	8.16	100	-3.42	0.00	

Schools with				significant
inadequate	45	20.67	7.45	
teachers				

In Table 9, an independent sample t-test was used to compare the differences in the mean academic achievements of students in schools with adequate English language and mathematics teachers and those with inadequate English language and mathematics teachers. The results revealed a significant difference between the two groups of schools ($t=-3.42$, $p<0.05$). As indicated in Table 9, the mean academic achievement of students in schools where teachers were adequate (mean =22.82, SD = 8.16) was significantly higher than that of schools where teachers were not adequate (mean =20.67, SD = 7.45). The analysis results provide no statistical justification for accepting the null hypothesis. Therefore, the null hypothesis was rejected.

9. Discussion of the Findings

The results on student academic achievement (as measured by the outcomes of the Achievement Tests in English Language and Mathematics) converted into three levels using percentile rank revealed that the proportion of students with low grades in the level of their achievement in the outcomes of the Achievement Tests in Southwestern Nigeria (41.46) is higher than the proportion of students that scored above average (28.61%) and those that were on average (29.77%). Based on the results, the level of academic achievement of secondary school students in Southwestern Nigeria is low, as reflected in English Language and Mathematics achievement tests. The findings of this study align with those of Adegbeile (2011), Pitan (2012), Ogundare (2019), and Olatunbosun (2023), who found that students' academic performance or outcomes were low. However, the findings of this study contradict the findings of Ayodele and Ige (2012), Ajani and Akinyele (2014), and Weaver (2019) that the students' academic achievement was moderately high because it was above average (i.e., most of the students scored above average). The finding equally negates that of Odunsi (2015), whose finding on student academic outcome was either low or high depending on a student's socioeconomic background.

The results on the level of TAD emanated from the critical analysis of the responses from the school administrators and the teachers of English Language and Mathematics in the sampled schools. The findings are based on the perspectives of school administrators and teachers. Looking at the results from the school administrators' perspectives, each of the schools in the studied area had at most 2 teachers each for English Language and Mathematics. The results also revealed that each school had at most 4 classes for SS I to SS III, totaling 12 classes in a school.

Therefore, it could be inferred from the findings based on these perspectives (teachers' perspectives) that most of the schools sampled had teachers available for each of the subjects (English Language and Mathematics), and their qualifications are related to education, although the level of their adequacy in terms of the available teachers' numerical strength was critical. Notably, the results of this study align with the findings of Adegbeile (2011), who had hitherto found that the number of teachers in the zone sampled for the study was inadequate, thus making the students' academic performance a matter of concern.

On the contrary, the findings of this study in terms of the qualifications and professional development of teachers are inconsistent with the results of the research works of Yara and Otieno (2010), Mbugua et al. (2012), and Mosha (2014), which showed that trained and qualified teachers were insufficient in Kenya and Tanzania. Furthermore, the result of the study is inconsistent with that of Jimoh (2011) as well as Adegoke and Mefun (2016), which showed that there were not enough qualified mathematics, basic science, and English language teachers in the schools. Adegoke and Mefun (2016) established that a sizable portion of the sampled teachers were not proficient in mathematics and that even those who were did not possess the necessary teaching

credentials. Additionally, the majority of the teachers were not members of Nigeria's professional associations, such as the Mathematical Association and the Science Teachers Association of Nigeria for Mathematics and Science teachers, respectively.

An independent sample t-test was used to establish disparities between the academic achievement of the students sampled in public senior secondary schools, where teachers were found to be adequate and inadequate. The statistical tool was used to compare the gap between the mean academic achievement of students in schools that had adequate mathematics and English language teachers and those with inadequate teachers. The findings indicate that there is no statistical justification for accepting the null hypothesis because there was a significant difference in students' academic achievement between the sampled schools where teachers (English Language and Mathematics teachers) were adequate and the schools where teachers were inadequate. Hence, the null hypothesis was rejected. Despite using teacher quality as an indicator of the independent variable, Omo (2011) found results similar to this study. The findings demonstrated that the observed variations in student performance among the four school categories were significantly explained by the variations in teacher quality, ascertained by the students' general school leaving certificate examinations in mathematics and English (Omo, 2011).

10. Conclusion

The study draws the following conclusions: the academic achievement of secondary school students in Southwestern Nigeria remains low, both in mathematics and English. In addition, teacher adequacy had a significant influence on the low academic achievement of the students, particularly as reflected by the results of their English language and mathematics achievement tests. However, in terms of the level of TAD, it was concluded that teachers (English Language and Mathematics teachers) in most of the public senior secondary schools sampled in Southwestern Nigeria were not adequate (in terms of their numerical strength and in comparison to the number of students as well as available classes engaged by the available teachers). Meanwhile, it could be inferred from the demographic characteristics of the respondents that most of the teachers possess qualifications in education, which are relevant to their teaching subjects. Most teachers agreed that there were opportunities and avenues for professional development through additional educational programs. The study also concludes that a significant difference exists between the academic achievement (in both English language and mathematics) of the students in schools where teachers were adequate and those where teachers were not adequate. This implies that the academic achievement of students in schools where teachers were adequate was significantly higher than in schools where teachers were inadequate.

11. Implications of Findings for Educational Stakeholders

The findings of this study have implications for educational stakeholders. In the first instance, the low level of SAA as revealed in the findings from the study could inform each of the education stakeholders (school administrators, school boards, ministries of education, and government) about the realities of the state of SAA in secondary schools in Southwestern Nigeria. Similarly, the foregoing educational stakeholders could see the implications of teacher adequacy for addressing the problem. The inadequacy of teachers in terms of their numerical strength, coupled with a barrage of heavy workloads faced by the available teachers, indicates that English Language and Mathematics teachers in public senior secondary schools in Southwestern were overutilised and/or poorly utilized. Therefore, if this trend continues, SAA will be seriously affected because teachers who are burdened with heavy workloads may inevitably become ineffective in discharging their duties. Another implication of this study's findings is that teacher adequacy goes beyond the numerical strength of the teachers. This implies that, apart from the adequacy of teachers, their qualifications (which should be from the faculty or institute of education) must be in tandem with their teaching subjects. The fact that most of the teachers (English Language and Mathematics teachers) were still up and doing in the execution of their duties despite the

heavy workloads they were saddled with is an indication that the available teachers need an urgent complement from the government in terms of the employment of more qualified teachers. This will go a long way in addressing the problem of teachers' critical inadequacy, as found in this study, and the overall positive influence of this will be appreciable and could lead to an improved SAA.

12. Limitations of the Study

Despite the geographical scope of the study encompassing three states (Oyo, Ogun, and Ekiti), we only sampled one senatorial district and three local government areas from each of the chosen zones in each state. The time and financial implications on the researchers mostly constrained the selection and sample size. Furthermore, the fieldwork of the researchers and their study assistants was slowed by security concerns in numerous locations in Southwestern Nigeria. The independent variable in this study was limited to teacher adequacy (with three indicators: student-teacher ratio, teacher subject qualifications, and teachers' professional development), and the dependent variable (student academic achievement) was limited to one, which was measured by the results of the English Language and Mathematics achievement tests in senior secondary school II in the sampled schools. The researcher and his assistants persuaded some reluctant respondents to participate in the study.

13. Recommendations

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

1. The ratio of available teachers to students should be considered to ensure the adequacy of teachers (in mathematics and the English language). Thus, the teacher-to-student ratio in Southwestern Nigerian public senior secondary schools should be 1:40. This measure is expected to minimize the task burden on teachers and enhance their efficiency and effectiveness in performing their responsibilities.
2. Constant exposure of teachers in senior secondary schools in Southwestern Nigeria to continuous capacity and professional development in areas such as additional degrees, training, workshops, and seminars, to ensure that they are conversant with the novel realities, methodologies, and *modus operandi* occasioned by the changing trends of the profession and the demands from the teachers.
3. The government and all other concerned educational stakeholders are to ensure that more classes are built so that the overpopulation of students as a result of bloated classrooms in most of the public senior secondary schools in Southwestern Nigeria is tackled and resolved.

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