# Teachers' quality and students' breakfast intake as correlates of academic achievement in Junior Secondary School Mathematics in Lagos State, Nigeria

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**Abstract**
*This study investigated the relationship between teachers' quality and students' breakfast intake, and academic achievement in junior secondary school Mathematics in Lagos State. Stratified random sampling was used to select a sample of 720 junior secondary school II students from 3 Educational Districts of Lagos State. Four research questions guided the study. Data was collected using Questionnaire on students' breakfast intake (r=0.86), Students' Evaluation of Teacher's Quality Scale (r=0.78) and Mathematics Achievement Test (r=0.82).Data was analyzed by utilizing Product Moment correlation coefficient and multiple regressions analysis at 0.05 level of significance. The outcome showed a significant relationship between the indicator variables and academic achievement in Mathematics. Teachers' quality has a major role in predicting students' academic achievement in junior secondary school Mathematics in Lagos State. Recommendations were made for the improvement of the quality of teachers and regular in-take of breakfast by students to ensure improvement in students' academic achievement in Mathematics.*

**Keywords**: Teachers' quality, Breakfast, Academic Achievement, Mathematics.

## Introduction

Education is the bedrock on which the advancement of any country depends. It makes one to be self-reliant and ready to contribute to the development and advancement of one's family, community, country and the world at large. According to Ukaoha in Amusan (2012), any nation that needs improvement in all endeavour ought to depend fundamentally on sound educational development in the light of the fact that the human development will prompt national development.

Educational system in Nigeria is faced with different challenges such as ensuring quality education, right approaches to teaching, attaining the right educational standard and excellent performance on the part of the students especially in external examinations To accomplish all these and some more, we have to improve on teaching as well as teachers' quality. The education sector is clearly influenced by the development that stresses students' academic achievement and considers the teachers responsible for these achievements. It then demonstrates that no educational system would accomplish quality teaching without having quality teachers; consequently, the quality of education at any level depends significantly on the quality of the teachers (Adegbite. and Adeyemi, 2008).

The role teachers play in the academic achievement of the students can't be underscored. Teachers assume a pivotal role in educational attainment since the teacher is in charge of the interpretation and execution of educational policies, curricular contents and instructional materials as well as the assessment of students' learning outcomes (Adeyemi, 2008). Teachers, therefore, make a lot of impact on the strategy of socialization and character improvement of the students inside the learning condition. Adeboye, (2012) is of the opinion that the achievement of any science program depends significantly on the classroom teacher

as he is the one that makes an interpretation of the considerable number of thoughts without hesitation. What the teachers are able to effectively do in the classroom affects the students' achievement which is determined by their scores in the subjects. Most times, students look forward to their scores in the core subjects (Mathematics being one of them) because of the importance of the subjects to their future career.

Mathematics is of great importance since it is fundamental for day-to-day living for everyone. For instance, the government employees use it in their workplaces for schedule of work, acquiring of materials, working out benefits and so on, the market women can also not do without it. Actually, it is utilized by both educated and non-proficient individuals. Ilori in Mammam and Eya (2014), declares that the significance of Mathematics has for quite some time been perceived everywhere throughout the world as a reason for understanding different subjects and that is the reason all students are made to offer Mathematics at primary and secondary school levels, regardless of whether they have aptitude for it or not.

The main role of teaching and learning process is to realize in the student alluring change in conduct through basic reasoning. This change, be as it may, does not depend just on the teachers' quality. Different components might be responsible for this change. Teaching has been explained by Wells in Fakoya, (2009) as group of exercises, for example, explaining, deducing, questioning, motivating, taking attendance, keeping records of work, student's progress and students' background information. Teaching includes imparting verifiable facts and convictions; it encourages students' participation and articulation of their own perspectives. The role of teachers is to assist students with achieving higher benchmarks of learning, ability, skill and good character. In the event that teachers do their function admirably, at that point their work is of great value to other people, not just in a specific time, but also in the future.

Gbagi, (2011), states that the academic standard in all Nigerian educational institutions has fallen significantly below the societal expectations. Blumende, (2001) authenticated this view when he revealed that the decline in the quality of education can't be overlooked by any individual who knows about the critical role of education as an instrument of societal change and improvement. Gbore, (2013) contended that one key superseding factor for the accomplishment of students' academic achievement is the teacher. In a similar vein, Ibrahim (2000) believed that teachers' qualifications and exposure can go far to realize students' high academic achievement. It is probably for this reason; Ibukun (2009) declared that no education system can transcend the quality of its teachers. Considering the statements of Ibrahim (2000), Gbore (2013) and Ibukun (2009), it implies that teachers' role in the readiness of students to succeed in examinations can't be undermined. Teachers quality is a standout amongst the most essential factors for students' achievement (Angle and Moseley, 2009; Eide, Goldhaber and Brewer, 2004).

Subject matters' knowledge is a variable that one may think could be identified with teachers' quality and effectiveness. Ashton and Crocker in Darling-Hammond (2000) found just 5 out of 14 studies they investigated showed a positive relationship between measures of subject matter knowledge and teacher's performance. Odedele, (2000) found that students' attitude towards science could be improved by the accompanying teacher-related elements: Teachers' excitement, teachers' resourcefulness and accommodating conduct, Teachers' thorough knowledge of the subject-matter and their making science very fascinating. Subsequently the teacher ought to be mentally prepared to teach Mathematics given that every other prerequisite is met. If students are to build up a positive mien to Mathematics, it is basic that the teacher conveys an uplifting frame of mind towards the subject by mastering the subject matter. Moreover, teachers need to set up a strong classroom learning condition that encourages the certainty of the students to learn Mathematics.

Classroom management is the ability to maintain decorum in the classroom for the ideal advantages of the students regardless of the

raucous conduct students may show. Darling-Hammond (2000) and Gordon, Kane and Staiger (2006) believe that the teachers' relational quality with students has a vital role in effectiveness of his teaching and the standard for estimating the viability of the teacher making the learning. Useni, Okolo and Yakubu, (2012), saw that collaboration among students and teachers has critical role in the students' achievement. They noticed that regression analysis demonstrated that relational components in the classroom were critical indicators of students' achievement.

Pedagogical abilities or classroom practices is a measure of what teachers do in their classroom. Some of the challenges of the teachers may be related to what to teach. Brophy in Okpala and Ellis (2005) expressed that quality teachers utilize a wide variety of instructional strategies, experiences, assignments and materials to guarantee that students are accomplishing a wide range of cognitive objectives. Iwoha (2001) saw that it was teachers' absence of compelling techniques for teaching Mathematics that frightens the students off from Mathematics. Salau (2002), in Useni, Okolo and Yakubu (2012) set that by its very nature Mathematics is conceptual and extra effort is required to bring students to comprehend its fundamental ideas, principles and applications.

Another variable of interest in this investigation is breakfast. Breakfast is the primary meal of the day, typically taken toward the beginning of the day (morning). It is the most critical nourishment of the day. Many researches demonstrated that morning meal is imperative in two different ways. Firstly, the general strength of the students relies upon the morning meal consumption. Furthermore, academic achievement of the students can be influenced because of breakfast consumption. Healthy breakfast can improve students from numerous points of view: like, in school attendance, class participation and advancement in identical test scores and increased class participation improves by and large academic achievement. Murphy, (2007) presents that Healthy breakfast can increase cognitive capacity and focus level. FRAC (2011) infers that morning meal skipping weakened students' bent to discover, in the meantime, taking proper breakfast improved students' conduct and academic achievement.

In an investigation report titled "Research Brief: Breakfast for Learning" (2015) the Food Research and Action Center (FRAC) gives the outline of the impact of breakfast on students' academic performance as:

- Children, who have breakfast at school nearer to class and test, perform better on state sanctioned tests over the individuals who skip breakfast or have breakfast at home.
- Students who have breakfast the morning of a standardized test have significantly higher scores in spelling, reading, and mathematics, compared with the individuals who don't have breakfast.
- Student's academic achievement increases, particularly for mathematics, when schools offer the School Breakfast Program.
- Students who take part in school breakfast show improved attendance, conduct, and academic achievement as well as diminished tardiness.
- Providing breakfast for students at school improves their focus, sharpness, comprehension, memory, and learning.
- Children who have breakfast show improved psychological capacity, attention and memory.
- Consuming breakfast improves students' achievement in Mathematical tasks, vocabulary tests, challenging mental tasks, and response to frustration.
- Providing students with breakfast in the classroom setting is related with lower late rates, less disciplinary office referrals and improved attendance rates.
- Students Mathematics and reading achievement test scores improve when breakfast is moved out of the cafeteria and into the classroom.

Nadeem and Umair, (2014) in an investigation that dissected a good dieting effort that restricted low quality nourishment from schools and presented healthier, freshly prepared schools meals found that participating students scored higher in English and science tests than students who did not partake in the campaign.

The present investigation was anchored on Walberg's Educational Productivity Theory (2001). One of the principal established comprehensive theories trying to map what influences academic achievement, was developed by Walberg. The theory made express factors that were expected to contribute to learning outcomes. In view of accessible proof, Walberg estimated the effect of specific (set of) factors in a variety of school subjects particularly in Mathematics. Three set of nine variables were theorized to improve students' achievement (Walberg, Welch, and Hattie, 2001). First were students' attributes or factors which include ability or prior achievement, age, motivation as demonstrated by personality tests or readiness to continue learning undertakings. Furthermore, are instructional factors, for example, quality of institution and some teachers' factors. The third portrays instructively invigorating elements like the home environment, classroom or school environment, the peer group and the mass media. The commitment of Walberg's investigations was pertinent to this study since the theory plainly makes a refinement between three sets of elements; the students' level, the instructional level and the environmental level.

The written works explored demonstrated that there is a significant relationship among the indicator factors (Teachers' quality and breakfast admission of the students) and academic achievement in Mathematics. The impact of teachers; teaching effectiveness (teachers' quality) on students' learning outcome as estimated by students' academic achievement has been the subject of a few studies (Adedeji, 2008; Adeyemi, 2008; Akiri and Ugborugbo, 2009). For example, Akiri and Ugborugbo, (2009) reported that effective teaching improved students' academic achievement. So also, Adeyemi, (2008) declares that science educator viability has centrality positive correlation with students' academic achievement in the senior secondary school certificate examination. Adedeji, (2008) find that teachers' supervision of students and quality of the teaching personnel has positive and strong effects on students' academic achievement. Also, Bellisle, (2004), Sorhaindo and Feinstein, (2006) in Kimbra &Denney (2015) present that access to nutrition that joins protein, sugars and glucose has been shown to improve students' cognition, focus, and vitality levels.

This study sought to discover the relationship between teachers' quality (in terms of knowledge of subject matter, classroom communication, classroom management and teaching methods) and Students' breakfast intake as they affect the students' academic achievement in junior secondary school Mathematics in Lagos state. From the literatures reviewed, it was noticed that the factors under investigation have not been united in an investigation. This study therefore filled the gap that other researchers left by uniting every one of the factors (variables) in a study as they influence the student' academic achievement in Mathematics.

In Nigeria, many secondary schools are built up at different places by government, private associations or people (Adedeji, 2008). Subsequently, teaching and learning happens under various conditions and by different teachers. Each school has its location, offices and works under various classroom conditions, however, all students are expected to write the same standard examination (for example Junior School Certificate Examination and Senior Secondary Certificate Examination) at the completion of their junior secondary education and senior secondary education respectively. It might be sensible to expect a uniform performance in Mathematics from all the students since they were taught using the same syllabus, however, a few schools appear to outperform others and generally, the performance have not been encouraging both at the junior and senior secondary schools level. There must be some determinants that are responsible for the steady failure in Mathematics and why some students appear to outperform others. To discover some of these determinants,

it is necessary to examine the relationship between teachers' quality and breakfast intake of students on the academic achievement in junior secondary school Mathematics in Lagos State, Nigeria.

**Research Questions**

The following research questions were raised for the investigation:

(1) Is there any significant relationship between teachers' quality and students' academic achievement in junior secondary school mathematics in Lagos State?

(2) Is there any significant relationship between breakfast intake of the students and students' academic achievement in junior secondary school mathematics in Lagos State?

(3) How much of the total variance in the students' academic achievement in junior secondary school mathematics (MAT) is accounted for by the predictor variables?

(4) Which of the predictor variables will be most effective in predicting students' academic achievement in junior secondary school mathematics in Lagos State?

**Methodology**

Survey research design was employed to collect data

*Population*

The population for the study comprised all Junior Secondary II students in Lagos state.

*Sample and Sampling Technique*

The investigation embraced a multi-stage sampling system to choose 720 participants. The first stage of the selection process involved the use of simple random sampling to select three educational districts from the six educational districts in Lagos state. Secondly, the secondary schools in each of the selected districts were stratified into private and public secondary schools. Thirdly, simple random sampling was used to select three schools from the private schools and three schools from the public schools giving a total of six secondary schools. The last stage involved the use of systematic random sampling to select 40 junior secondary school II students from each of the sampled schools. A total of 720 students participated in the study. The distribution of the respondents is as shown in Table 1.

**Table 1: Distribution of Respondents across Gender and School Type**

| | School Type | | |
|---|---|---|---|
| Gender | Private | Public | Total |
| Male | 180 | 180 | 360 |
| Female | 180 | 180 | 360 |
| Total | 360 | 360 | 720 |

*Research Instruments*

The instruments used are:

(i) Students Evaluation of Teacher's Quality Scale (SETQS)

(ii) Questionnaire on Breakfast intake of Students (QBIS)

(iii) Mathematics Achievement Test (MAT)

**Students Evaluation of Teacher's Quality Scale (SETQS)**

This scale consisted of two sections: A and B; section A focused on the bio data of the students. This consisted of the students' school name. Section B consisted of twenty (20) items adapted from the work of Omeonu Catherine Ifeyinwa, (2011), Students Evaluation of Teacher's Quality Scale (SETQS), which was placed along five options (Likert Scale) ranging between 1 and 5. The twenty items were subdivided into four sections namely; knowledge of subject matter, classroom communication, classroom management and use of variety of teaching methods with each having five items. The reliability and content validity of this instrument were established using Cronbach Alpha and Lawshe method respectively. The coefficients were 0.80 and 0.71 respectively.

**Questionnaire on Students Breakfast Intake (QBIS)**
This scale contains two sections; A and B. Section A elicits bio-data and demographic information like name of school, class, gender, age, parent's qualification, and parent's occupation. While Section B is a four point likert-type scale with twenty five structured questions on breakfast intake. The reliability and content validity of this instrument were established using Cronbach Alpha and Lawshe method respectively. The coefficients were 0.78 and 0.74 respectively.

**Mathematics Achievement Test (MAT)**
This instrument consisted of two sections: A and B; section A was on the bio-data of the student which consisted of the students' school and class. Section B consisted of 40 items constructed from seven (7) topics in junior secondary school II scheme of work. The test blueprint based on the first three levels of Bloom's taxonomy of educational objectives was constructed for 250 items and was trial tested. The difficulty indices and discriminating indices of the items were found. The items with difficulty indices between 0.40 and 0.75 and with discriminating indices between 0.32 and 0.45 were finally selected. This reduced the items to fifty (50) which were finally used for the study.

***Validity and Reliability of Research Instrument***
Students Evaluation of Teacher's Quality Scale (SETQS) and Questionnaire on breakfast intake (QBIS) were content validated by specialist in Measurement & Evaluation and seasoned researchers.

*Data Collection*
Research officers administered the questionnaires on Student Evaluation of Teacher's Quality, Breakfast intake and the Mathematics achievement test to the randomly selected students in the sampled schools.

*Analysis of Data*
Multiple regression analysis was carried out using scores from Students Evaluation of Teacher's Quality Scale (SETQS) and questionnaire on Students' breakfast intake as independent variables while scores in Mathematics achievement Test (MAT) as the dependent variable.

**Results and AnalysisResearch Question 1:**Is there any significant relationship between teachers' quality and students' academic achievement in junior secondary school mathematics in Lagos State?

A Pearson Moment Correlation Coefficient was computed using SPSS software package to establish the relationship between the Teachers' quality (TQ) and the dependent variable, mathematics achievement test (MAT). The results are shown in Table

**Table 2. Correlation between Teachers' Quality (TQ) and Students' Achievement in Mathematics (MAT)**

| Variable | N | Mean | SD | df | r | sig. |
|---|---|---|---|---|---|---|
| **Teachers' Quality** | **720** | **72.32** | **12.05** | **718** | **0.241**** | **0.002** |
| **MAT** | **720** | **55.58** | **15.02** | | | |

**Note: N = 720, ** p< 0.05 (2-tailed)**

Table 2 shows that the Teachers' Quality has a low positive correlation with the students' achievement in Mathematics. This implies that there is a positive relationship between students' achievement in mathematics (MAT) and Teachers' Quality ($r = 0.241^{**}$, $n = 720$, $p \leq 05$).
Research Question 2*:* Is there any significant relationship between breakfast intake of the students and students' academic achievement in junior secondary school mathematics in Lagos State?
A Pearson Moment Correlation Coefficient was computed using SPSS software package to establish the relationship between the Students' breakfast intake (SBI) and the dependent variable (Mathematics achievement Test, (MAT). The results are shown in table 3:

**Table 3. Correlation between Students' Breakfast intake (SBI) and Students' Achievement in Mathematics (MAT)**

| Variable | N | Mean | SD | df | r | sig. |
|---|---|---|---|---|---|---|
| **SBI** | **720** | **54.68** | **10.58** | **718** | **0.36**** | **0.000** |
| **MAT** | **720** | **55.58** | **15.02** | | | |

***Note: N = 720, ** p< 0.01 (2-tailed)***

Table 3 shows the level of relationships that exist between Students' breakfast intake (SBI) and Students achievement in Mathematics (MAT). From the table, there is a positive significant correlation between students' breakfast intake (SBI) and Students achievement in Mathematics (MAT), r = 0.36, df =718, n = 720, p< 0.05.

**Research Question 3:**How much of the total variance in the students' performance in Mathematics achievement test (MAT) is accounted for by TQ and SBI?

Table 4 shows the Model Summary of the regression analysis in relation to performance in Mathematics.

Table 4. Model Summary for performance in Mathematics

| Subject | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| **Mathematics** | 0.297 | 0.239 | 0.028 | 14.807 |

From Table 4, the value of R= 0.297 indicates a moderate level of prediction and also, $R^2$ value of 0.239 (Coefficient of Determination), which is the proportion of variance in the dependent variable that can be explained by the independent variables. This shows that all the independent or predictor variables in this study explained 23.9% of the variability of the dependent variable.

**Research Question 4*:*** Which of the predictor variables (TQ and SBI) will be most effective in predicting candidates' performance in Mathematics in Lagos State?

Table 5 shows the coefficients in relation to performance in Mathematics vis-à-vis other independent variables:

Table 5: Coefficients on performance in Mathematics

| | Unstandardized Coefficients | | Standardised Coefficients | T | Sig |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| **CONSTANT** | 41.864 | 6.580 | | 6.362 | .000 |
| **TQ** | 0.310 | 0.116 | 0.249 | 2.678 | .002* |
| **SBI** | 0.205 | 0.132 | 0.144 | 1.555 | .004* |

TQ = Teacher Quality; SBI = Student Breakfast Intake

Table 5 shows that Teachers' quality (TQ) ($\beta_1$ = 0.249; t = 2.678, p< 0.05) is the most influential predictor of candidates' performance in junior secondary school mathematics in Lagos state. The result further revealed that the student breakfast intake (SBI) ($\beta_2$ = 0.144; t = 1.555, p< 0.05) is next to Teachers' quality in the prediction hierarchy.

**Discussion**

The finding of the study as shown in table 2 revealed that there is a significant low positive correlation between teacher's quality and student's' achievement in junior secondary school mathematics in Lagos State It could be inferred that as teachers' quality increases, the performance of the students in Mathematics also increases. This finding is similar to the findings of Laidra & Tola (2007), where teachers quality was found to be good predictor of students' performance in their subjects.

The study further revealed, as shown in table 3, that there is a positive, significant and moderate correlation between students' breakfast intake (SBI) and students' achievement in junior secondary school mathematics in Lagos State It could be inferred that as the students' breakfast intake is improved upon, the performance of the Students in junior secondary school Mathematics also increases. This claim agrees with Moheny, (2010) and FRAC (2011), submissions that Healthy breakfast can increase cognitive capacity and concentration level and that taking proper breakfast enhanced students' behavior and academic performance.

Furthermore, the findings also revealed from table 4 that all the independent or predictor variables in this study explained 23.9% of the variability of the dependent variable. This means that 23.9% of the total variance in candidates' achievement in junior secondary school mathematics in Lagos State was accounted for by the teachers' quality and students' breakfast intake.

Finally, table 5 revealed that of all the variables examined in this study, Teachers' quality is the most influential predictor of candidates' achievement in junior secondary school mathematics while breakfast intake is next to teachers' quality in the prediction hierarchy.*Implication of the Study for*

*Qualitative Planning*

This investigation has implications, for the government, teachers, students, schools and parents/guardians. The investigation uncovered that academic achievement of the students in junior secondary school Mathematics in Lagos state was predicted by all the independent variables (Teachers' quality and students' breakfast intake). The implication of this is that educational planners and policy makers should consider the quality of the Mathematics teachers and the students' breakfast intake, in deciding effective and suitable techniques in teaching and learning Mathematics. In this way, it is hoped that the achievement of the students in Mathematics will be enhanced.

**Recommendations**

In view of the discoveries, the accompanying recommendations are made:

(1) Mathematics teachers should create positive healthy work ethics, attitude and enthusiasm to their teaching job.
(2) Secondary school educational authorities should ensure that only teachers who are qualified to teach Mathematics are engaged.
(3) Federal and states ministry of Education, should organise regular seminars, workshops and in-service trainings for the teachers to invigorate their memories about new developments and skills being used in the field of teaching Mathematics to secondary school students so as to improve the quality of teaching strategies of the teachers as well as improving the learning processes of the students.
(4) For qualitative planning of education in the state and local government areas, the school inspectors should visit schools all the time. This will help in guaranteeing teachers' competence, improving Learning condition and academic excellence in schools.
(5) Parents and class teachers should ensure that students take light breakfast before teaching and learning activities begins in the class. This goes far to guarantee the assimilation, understanding and active participation of the students in the class.

**Conclusion**

The focus of this study was to use Pearson Product Moment correlation coefficient and Regression analysis to investigate the relationship between Teachers' quality, Students breakfast intake and Students achievement in

junior secondary school mathematics in Lagos State. Results indicated that all the predictor variables in this study contributed significantly to the prediction model of students' achievement in junior secondary school mathematics in Lagos State.

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