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Relationship between Parental Involvement and Mathematics Achievement of Primary School Pupils in Nsukka Nigeria: Need for Educators and School Psychologists' Intervention

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Abstract
Most Nigerian parents seem not to know the importance of parental involvement in their children's academic achievement. The dwindling rate of academic achievement of primary school pupils in Nigeria nowadays is a huge source of concern to the stakeholders in education. This study assessed the relationship between parental involvement and achievement Mathematics of 359 primary school pupils. Parental Involvement Questionnaire (PIQ) and Mathematics Achievement Test were used for data collection. Data collected for the study were analyzed using Pearson Product Moment Correlation Coefficient, regression analysis and t-test for the significance of two samples correlation coefficients at 0.05 level of significance. The results show that there is a positive relationship between parental involvement and pupils' Mathematics achievement. It also revealed that gender does not significantly moderate the relationship between parental involvement and pupils' Mathematics achievement. The result finally showed that pupils' low achievement in Mathematics was due to lack of parental involvement.

Key Words: Parental Involvement; Primary Education; Mathematics Achievement.

Introduction

Primary Education

Primary education is an indispensable component of the educational system. The Federal Republic of Nigeria, in her national policy on education (FRN, 2013), defines primary education as the education given in an institution to children aged 6 to 11 years. The document added that primary education is the key to the success or failure of the whole education system; its duration is six years, and children who attend primary schools are known as pupils. Primary education aims at developing the basic education skills as well as the transmission of culture to younger generations since the rest of the education system is built upon them. The period of primary school provides pupils with the fundamentals of reading, writing, skill acquisition, information, and attitude required for proper adjustment into society. In essence, primary education aims to offer experiences that maximize pupils' learning and academic development. It plays a fundamental, formative role in the survival of the whole education system in Nigeria.

The Federal Republic of Nigeria in her National Policy on Education (FRN, 2013) stipulated that the general objectives of primary education are to: inculcate permanent literacy and numeracy and the ability to communicate effectively; lay a sound basis for scientific and reflective thinking; give citizenship education as a basis for effective participation in any contribution to the life of the society; mold the character and develop sound attitudes and morals in the child; develop in the child the ability to adapt to the child's changing environment; give the child opportunities for developing a manipulative skill that will enable the child to function effectively in the society within the limits of the child's equality; and provide the child with basic tools for further educational advancement, including preparation for the trades and crafts of the locality; and a basis for the These objectives formed the foundation for the provision of primary education in Nigeria. Consequently, to achieve these objectives of the primary school curriculum, mathematics is made one of the core (compulsory) subjects to be taught at the primary school level.

For the scientific and technological development of a nation, knowledge of mathematics is indispensable. Ale and Adetula (2010) said that the line of demarcation between the developed and the undeveloped nations is based on their level of mathematical attainment. Mathematics is considered to be the father of all sciences (Opara & Magnus-Arewa, 2017). Mathematics is one subject that is an integral part of everyone's life and affects virtually every field of human endeavor; its uses and applications in the home, office, business, industries, food preparation, agriculture, decision-making, and even in governance, among others, are uncountable. Therefore, mathematics, as an undisputed agent of national development and wealth creation, equips individuals with knowledge and skills to solve a wide range of practical problems they may encounter in life. At the primary school level, through mathematics, pupils acquire sound knowledge of numbers, measures, and structures, as well as basic operations and basic mathematical presentations (Opara & Magnus-Arewa, 2017). It allows pupils to develop essential numeracy skills to solve problems in society. Mathematics is indeed the bedrock of primary education, and without mathematics, there is no modern technology, and without modern technology, there is no modern society (Okeke & Okeke, 2011).

Despite the importance of primary education and mathematics to the development of a nation in science and technology, pupils' academic achievement, especially in mathematics, has been consistently poor, both on the internal (first school leaving certificate) and transition examination into junior secondary school, known as the common entrance examination. The pupils' academic achievement determines if they will be enrolled in secondary school or not. In Enugu State and Nsukka Local Government Education Authority in particular, pupils' academic achievement in these examinations, especially in mathematics, has been consistently poor, leading to low enrollment of pupils in secondary school (Enugu State Ministry of Education, 2019). According to the Enugu State Ministry of Education, from 2010 to 2019, there has been a steady decline in the academic achievement of pupils in these examinations, and because of that, the cut-off mark for entry into secondary schools has been lowered in order to enable pupils get admission into the state secondary schools.

This poor Mathematics achievement of pupils in the internal (first school leaving certificate) and transition examinations into junior secondary school, known as the common entrance examination, has become a source of concern to stakeholders in education. It is essential to note that due to the present situation in Nigeria, the government cannot meet the various material and academic needs of the pupils, and there is a need for conscious assistance on the part of the parents in providing their children the needed support and materials for schooling and being fully involved in the academic activities of their children. Parents simply mean the father and mother of a child. That is why parents' involvement in their children's education is an integral component of government efforts to allow parents to participate actively in the reformation process of their children's school (Peiffer, 2015). The need for parental involvement necessitated the formation of the Parents Teachers Association (PTA) and Community-Based Education (CBE) in Nigeria.

Parental Involvement

Parents are couples who undertake the responsibility of grooming and raising up children, both biological and adopted children.Parents play major roles in the educational achievement of pupils. With the increasing demands on the family, parental involvement in the education of their children extends beyond the school building. Parental involvement is seen as the totality of strategies, actions, and resources that parents use during the schooling of their children to improve their chances of becoming successful from an educational and social point of view (Hatos, 2014). According to Abd-El-Fattah (2016), parental involvement in a child's education is a mechanism or a way of raising standards, developing new partnerships between schools and parents in the local community, and encouraging social inclusion. Parental involvement has also been defined across studies as representing many different behaviors and practices at home (home-based involvement) and at school (school-based involvement) intended to assist the children's overall learning experiences (Abd-El-Fattah, 2016; Hornby & Lafaele, 2011).

Home-based parental involvement includes helping with the child's homework, listening to the child as they read, buying textbooks for the child, talking with them about school, expressing high expectations,

encouraging school success, and providing an environment that is conducive to learning at home (Altschul, 2012). While school-based parental involvement on the other hand includes volunteering at school, attending parents-teachers' association meetings, education workshops, participating in school activities and events, and school organizations, as well as communicating with teachers and school staff (Hornby & Lafaele, 2011; Fernández-Alonso et al., 2017). On the other hand, Levanda (2011) posited that parental involvement includes a wide range of actions parents take for the benefit of their children's academic success at school. These actions are influenced by parenting style, parental expectations and aspirations, home rules, and parents' attitudes towards their children's activities. helping pupils with their homework and visiting their schools to talk to their teachers regarding their child's education (Levand, 2011; Porumbu & Necsoi, 2013). Thus, operationally, parental involvement is seen as the direct and indirect ways parents help in the educational activities of the child both at home and at school by fulfilling their duties as parents in partnership with the school and the teacher in making sure that the child is assisted in the teaching and learning process as much as they can to influence positively the cognitive and psychosocial development of the child. According to Epstein (2005), students at all school levels do better academically and develop more positive school attitudes, high self-efficacy, higher aspirations, and other positive behaviors if they have parents who are aware, knowledgeable, encouraging, and involved in their academic activities.

Some studies conducted by Olatoye and Ogunkola (2008), Kimaro and Machumu (2015), and Amponsah et al. (2018) showed a positive relationship between parental involvement in education and students' academic achievement. In contrast, in the research study carried out by Clay-Spotser (2014) on self-efficacy, locus of control, and parental involvement on students' academic achievement, the result showed that no statistically significant differences were found between parental involvement and students' academic achievement. Also, Tokac and Kacayoruk (2012) found that parental involvement has no positive effect on students' academic achievement. Similarly, Kuan and Chuen (2017) found no significant relationship between parental involvement and students' academic achievement. The outcome of these studies shows that the influence of parental involvement on academic achievement is critical and inconclusive. Meanwhile, the assumption that the more parents are involved in the educational activities of their children, the more efficacious the child will become and the higher the child's academic achievement will be, is questionable. This is because pupils whose parents do not involve themselves in their educational activities, have no conducive environment for learning at home, lack parental support and encouragement, and whose parents do not assist them with homework at all because they don't even have time for it, have equally been found to develop their potential and talents to the optimal level. They have also been found to have high academic achievement.

From the foregoing, it can be seen that the effects of parental involvement on pupils' academic achievement have not been extensively studied. On the other hand, gender has been considered by many studies as a significant factor that accounts for pupils' academic achievement in any given subject, but the moderating influence of gender on the relationship between parental involvement and self-efficacy has not been established by researchers on primary school pupils. There is a need to investigate these variables to objectively establish the relationships between parental involvement and pupils' academic achievement, as well as the moderating influence of gender on these variables. Hence, the main purpose of this study is to determine the extent to which parental involvement correlates with pupils' academic achievement in mathematics as moderated by gender. Specifically, the study determined the relationship between parental involvement and pupils' academic achievement in mathematics and the moderating influence of gender on the relationship between parental involvement and pupils' academic achievement in mathematics.

Methods

This study adopted a correlational survey research design to assess the relationship between parental involvement and pupils' achievement in mathematics.

Participants

The population for this study consists of 3566 primary five pupils (1610 males and 1956 females) of the 2019/2020 academic session in all the 104 government-owned primary schools in Nsukka Local Government Education Authority (Source: Enugu State Universal Basic Educational Board, 2021). The primary five pupils were chosen to know their problems on time and know how to prepare them to achieve success in the internal (first school leaving certificate) and transition examination into junior secondary school, known as the common entrance examination in the future. Also, because it is assumed that at primary 5, they have been taught mostly all the various concepts in the curriculum and are getting ready for both the internal and external examinations,

A sample of 359 pupils (162 male and 197 female) was used for this study. The sample size will be derived using Taro Yamane's formula. A multi-stage sampling procedure was adopted for this study. In the first stage, two local government areas (Nsukka Central and Nsukka East) were sampled from three local government areas using a simple random sampling technique with replacement. The names of the local governments were

written on pieces of paper, folded and put in a container, shuffled, and the researcher drew the local government areas with replacement (i.e., balloting with replacement). At the second stage, proportionate stratified sampling was used to sample twenty (20) primary schools from the two selected local government areas (i.e., 12 primary schools from Nsukka Central and 8 from Nsukka East local government areas). In the third stage, proportionate stratified sampling was used to sample 359 pupils from the two sampled local government areas (i.e., 208 pupils from Nsukka Central and 151 from Nsukka East LGAs, respectively) using the formula (number of pupils in a local government divided by the total number of pupils in the two local government areas times the sample size). *(i.e.,* n N x sample size, where n = number of pupils in a local government while N = total number of pupils in the two local government areas). At the fourth stage, proportionate sampling technique was also used to sample 162 male pupils (i.e., 100 from Nsukka Central and 62 from Nsukka East) and 197 female pupils (i.e., 108 from Nsukka Central and 89 female pupils from Nsukka East, respectively) by using the same formula above. The proportionate sampling technique was used in the second, third, and fourth stages because the numbers of schools and pupils, both male and female, in the two local government areas are not equal.

Tools and Procedures for Data Collection

Two instruments were used for data collection (the Parental Involvement Questionnaire (PIQ) and the Mathematics Achievement Test). The PIQ was developed by the researcher. The PIQ was grouped into two sections: section A and section B. Section "A" sought information on pupils' biodata, including class and gender, while Section "B" consists of 15 items relating to parental involvement and was modeled on a four-point rating scale. The response options for the items are "very much" (VM), "much" (M), "little" (L), and "very little" (VL), with numerical values of 4, 3, 2, and 1 points assigned to each of the responses, respectively. The Mathematics Achievement Test was adopted from the Ministry of Education's 2017 Transition Examination into Junior Secondary School in Enugu State. The test is made up of 20 objective questions in mathematics.

The instruments, the Parental Involvement Questionnaire (PIQ) and the Mathematics Achievement Test, were face-validated by three experts: one expert in measurement and evaluation from the Department of Science Education and two experts in psychology from the Department of Educational Foundations, all from the University of Nigeria, Nsukka. The experts were requested to assess the instrument with regard to the clarity of items, simplicity of vocabulary, and relevance of items to the study. Based on the observations of these experts, the research instruments were modified appropriately. The questionnaires were trial-tested on 30 primary school pupils in 3 primary schools in Igbo-Etiti Nsukka West local government, outside the sampled areas. In order to determine the internal consistency of the items, the responses of the pupils were subjected to a Cronbach's alpha reliability estimate, and a reliability coefficient of 0.82 was obtained. Cronbach Alpha was used because the questionnaire items were polytomously scored.

Results

Pearson Product Moment correlation coefficient was used to answer research questions 1 and 2, while research questions 3 and 4 were answered by comparing the correlation coefficients (r) for male and female pupils. A correlation coefficient of 0.00 was regarded as no relationship, 0.01 to 0.29 was regarded as a low relationship, 0.30 to 0.79 was regarded as a moderate relationship, and a correlation coefficient of 0.80 and above was regarded as a high relationship (Nworgu, 2015). Regression analysis was used to test hypotheses 1 and 2, while hypotheses 3 and 4 were tested using a t-test for the significance of two-sample correlation coefficients at the 0.05 level of significance.

Table 1

Variable	$\bar{X}$	SD	N	R	R^2
parental involvement	63.32	8.25	359	0.72	0.52
Pupils' Achievement	71.21	9.92			

$\alpha = 0.05$, R^2 = coefficient of determination.

Note: *A Pearson's product moment correlation analysis of the relationship between parental involvement and pupils' academic achievement in mathematics.*

To answer this research question, the scores from the responses of the respondents on parental involvement were correlated with pupils' academic achievement. The result in Table 1 shows that the correlation coefficient obtained between parental involvement and pupils' academic achievement was 0.72. This means that there exists a positive and moderate relationship between parental involvement and pupils' academic

achievement. Table 1 also shows that the coefficient of determination (R^2) associated with the correlation coefficient of 0.72 was 0.52. This coefficient of determination (R^2) indicates that 52% of pupils' academic achievement in mathematics is attributed to or predicted by parental involvement.

Table 2

Variable (gender)	**N**	**R**	**R^2**
Male	162	0.58	0.34
Female	197	0.63	0.40

$\alpha = 0.05$, R^2 = coefficient of determination

Note: *A Pearson's product moment correlation analysis on the moderating influence of gender on the relationship between parental involvement and pupils' academic achievement.*

In order to answer research question three, the scores from the responses of male and female respondents (pupils) on parental involvement were correlated with the scores of the pupils' academic achievement. The result shows that the correlation coefficients (R) of 0.58 and 0.63 with associated coefficients of determination (R^2) of 0.34 and 0.40 were obtained for male and female pupils, respectively. This means that there was a positive and moderate relationship between parental involvement and the academic achievement of male and female pupils, with the latter being more favorably affected. The difference in the relationship between parental involvement and pupils' academic achievement is 0.05 in favor of the female pupils. The coefficients of determination R2 indicate that 34% of the variation in the academic achievement of male pupils can be attributed to parental involvement, while 40% of the variation in the academic achievement of female pupils can be attributed to parental involvement. The difference in the variation of male and female pupils' academic achievement as predicted by parental involvement is 6% in favor of female pupils. Hence, gender moderated 6% of the variation in pupils' academic achievement in favor of females than their male counterparts in mathematics.

Table 3

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	23151.011	1	23151.011	161.841	.000
Residual	51067.947	357	143.047		
Total	74218.958	358			

$\alpha = 0.05$

Note: *A Regression analysis of parental involvement and pupils' academic achievement in mathematics.*

In order to test Hypothesis 1, regression analysis was used. The result in Table 3 shows that an F-ratio of 161.841 with an associated exact probability value of 0.00 was obtained. This probability value of 0.00 was compared with 0.05, which was set as the level of significance for testing the hypothesis, and it was found to be significant because 0.00 is less than 0.05. The null hypothesis, which states that there is no significant relationship between parental involvement and pupils' academic achievement in mathematics, was not accepted. The inference drawn was that there is a significant relationship between parental involvement and pupils' academic achievement in mathematics. In other words, parental involvement is a good predictor of pupils' academic achievement in mathematics.

Table 4

Variable (gender)	**N**	**R**	**d_f**	**S.E**	**t-cal**	**t-crit**	**Dec**
Male	162	0.58	353	0.11	-0.45	1.96	NS
Female	197	0.63					

Key: R = correlation coefficient, N = Number of respondents (students), d_f = Degree of freedom, S.E = Standard Error, t-cal = t-test value calculated, t-crit = t-test critical or table value, Dec = Decision, Ns = Not Significant.

Note: *A t-test analysis of the significant difference between the correlation coefficients (r) of male and female pupils in the relationship between parental involvement and pupils' academic achievement in mathematics.*

Table 4 shows the t-test analysis of the significant difference between the correlation coefficients (r) of male and female pupils in the relationship between parental involvement and pupils' academic achievement in mathematics. The result shows that the calculated t-value of -0.45 with the t-critical or table value of 1.96 at the 0.05 level of significance and 353 degree of freedom was obtained. The decision rule is to reject the null hypothesis if the calculated t value is greater than the t-critical or table value; otherwise, do not reject. Therefore, since the calculated value of t (-0.45) is less than the t-critical value (1.96), the null hypothesis, which states that there is no significant relationship between parental involvement and pupils' academic achievement in mathematics based on gender, is not rejected. In other words, there is no significant difference between the correlation coefficient of male and female pupils in the relationship between parental involvement and academic achievement in mathematics. The inference drawn is that gender does not significantly moderate the relationship between parental involvement and pupils' academic achievement in mathematics.

The results show that there is a significant relationship between parental involvement and pupils' academic achievement in mathematics. It also revealed that gender does not significantly moderate the relationship between parental involvement and pupils' academic achievement in mathematics. The results depicted that parental involvement is a critical factor in pupils' self-assessment in mathematics. Pupils whose parents are not involved in their academic activities seem to do worse than their peers whose parents show interest in their children's studies.

Discussion

The findings of this study, as presented in Table 2, showed that there exists a positive and moderate relationship between parental involvement and pupils' academic achievement in mathematics. It also showed that there was a significant relationship between parental involvement and pupils' academic achievement in mathematics. These findings are in accordance with the findings of Olatoye and Ogunkola (2008), Kimaro and Machumu (2015), and Amponsah et al. (2018). Olatoye and Ogunkola (2008) found a significant relationship between parental involvement and science achievement as well as between interest in schooling and science achievement. Kimaro and Machumu (2015), in their own study, found a positive and significant relationship between parental involvement in school activities and children's academic standing. While Amponsah, Milledzi, Ampofo, and Gyambrah (2018) found a positive relationship between parental involvement in education and students' academic achievement, This implies that parents' involvement in the academic activities of their children has a great influence on their academic achievement, especially at the primary school level. Supporting this, Epstein (2005) opined that students at all school levels do better academically and develop more positive school attitudes and high self-efficacy if they have parents who are aware, knowledgeable, encouraging, and involved in their academic activities. However, the findings of this study are not in agreement with the findings of Clay-Spotser (2014), who found no statistically significant relationship between parental involvement and students' academic achievement. Tokac and Kacayoruk (2012) found that parental involvement has no positive effect on students' academic achievement. In the same manner, Kuan and Chuen (2017) found that there was no significant relationship between parental involvement and students' academic achievement.

The findings of the study showed that there was a positive and moderate relationship between parental involvement and pupils' academic achievement for male and female, with the female pupils doing better in mathematics. The result also showed that there was no significant difference between the correlation coefficients of male and female pupils in the relationship between parental involvement and pupils' academic achievement. This means that gender does not significantly moderate the relationship between parental involvement and pupils' academic achievement.In other words, parental involvement in school activities significantly influences pupils' academic achievement, regardless of gender. This result is in line with earlier findings by Omenka and Kurumeh (2013) and Considine and Zappala (2002). Omenka and Kurumeh (2013) found that there is no significant effect of gender on students' academic achievement. While Considine and Zappala (2002) in their own separate study found that there exists a positive and direct relationship in the moderating influence of gender on achievement in favor of females than their male counterparts. The result also depicted that pupils' low achievement in Mathematics was due to lack of parental involvement.

Conclusion

Parental involvement has a positive relationship with the academic achievement of primary school pupils in mathematics. Gender does not significantly moderate the relationship between parental involvement and pupils' academic achievement. This study therefore provides information required by parents, teachers, and other stakeholders in understanding the influence of parental involvement on academic achievement in mathematics and thereby provides a real opportunity for the use of this information in predicting pupils'

achievement in mathematics. It gives stakeholders the opportunity to understand and be in a position to help improve academic achievement in mathematics, especially at the primary school level.

Recommendation

The findings of the study indicated that parental involvement has a significant relationship with academic achievement; this implies that if parents do not participate actively in the education activities of their children, the pupils' achievement will be below expectations. Parents' level of involvement in the wellbeing and academic activities of their children greatly influences their proper intellectual development. Parents should participate actively in the academic activities of their children, irrespective of their gender, both at home and at school. The educational planners and administrators should periodically organize seminars and conferences for parents to enlighten them on the significant role of their involvement in their child's learning activities in enhancing their learning ability, irrespective of the child's gender. For effective involvement of parents, schools should have partnership programs in place that continually develop, implement, evaluate, and improve plans and practices encouraging family and community involvement in school activities. Schools should encourage parents' involvement in several areas, including parenting, learning at home, communication, volunteering, community collaboration, and decision-making.

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Ethical Clearance
The Research Ethics Committee of the Department of Educational Foundations, Faculty of Education, University of Nigeria, Nsukka approved the undertaking of this prison study.

Conflict of Interest
The Authors of this work have no financial or any kind of conflict of interest to declare.

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