

Parents' Education, Occupation and Real Mother's Age as Predictors of Students' Achievement in Mathematics in Selected Secondary Schools in Ogun State, Nigeria

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Abstract

Mathematics is the language of science and technology, and so it is a force to reckon with in the development of any nation. Several studies in the past have focused on the factors associated with students' poor academic achievement in Mathematics. However, very few of those have considered the influence of multiple indicators on students' achievement in Mathematics at the secondary school level with a view to establishing their combined influence on students' academic achievement. This study, therefore investigated the causal-effects of parents' education, occupation and real mother's age as predictors of students' achievements in Mathematics among secondary school students in Ogun State, Nigeria. The study employed ex-post facto type of research design. The sample was selected using the multi-stage sampling technique. Two thousand four hundred students from 60 selected schools in nine local government areas within Ogun State, Nigeria were involved. Two research instruments namely; Students' Questionnaire; ($r = 0.87$) and Mathematics Achievement Test; ($r = 0.84$) were used. One research hypothesis was tested and data were analysed using multiple regression at .05 level of significance. The result reveals that parents' education has the highest significant influence on the academic achievement of students in Mathematics while the effect of real mother's age had the least effect among the variables which exerted significant effects on students' academic achievement in Mathematics.

Keywords: Parents, Education, Occupation, Real Mother's Age, Academic Achievement.

INTRODUCTION

The importance of Mathematics transcends all definitions and the prosperity of any country depends on the volume and quality of Mathematics offered in its school system. Obe (1996) conceptualizes Mathematics as the master and servant of most disciplines and thus, a source of enlightenment and understanding of the universe while, Graeber and Weisman (1995) agreed

that Mathematics helps the individual to understand his/her environment and to give accurate account of the physical phenomena around him/her. To this end, Setidisho (2001) submits that no other subject forms a strong binding force among various branches of science as Mathematics, and without it, knowledge of the sciences often remains superficial.

Emphasizing the importance of the subject to the society, Robert (1987) stated that in the United States, Mathematics has come to play important roles: in the engineering of highways, the search for energy, the designing of television sets, the profitable operation of most businesses, astronauts flying space-craft, the study of epidemics, the navigation of ships at sea, etc., all depend on the study of Mathematics. Ogunbanjo (1998) opines that all over the world, science has been accepted as a vehicle of technology, social and economic development. Mathematics is not only basic to these but is the language of science. In another related study, Igbokwe (2003) highlights the intricate link of Mathematics to science and technology, and contends that without Mathematics there will be no science and without science there will be no technology, and without technology there will be no modern society. These and many more reasons are why the Nigerian government believed that the subject should be taken seriously in our school system; and Nigeria, in her march towards technological development, has not only made Mathematics a compulsory subject in the curriculum of the primary and secondary school levels of her educational system (Federal Republic of Nigeria, 2004) but also as a prerequisite to the study of science courses in her colleges, polytechnics and universities (JAMB Brochure 1992-2007).

Over the years, the investigations on factors affecting academic achievement of students in Mathematics have attracted the interest of researchers and some of the factors identified are low socio-economic status of the family (Sogbetan, 1981), students' attitude (Hassan, 1983), poor family structure (Steinberg, 1993), parents' education, income and occupation (Maple and Stage, 1991) as well as the age of the mother at the birth of the child (Brooks-Gunn and Chase-Lansdale, 2001).

According to Simon (2004), socioeconomic status like parents' education, occupation, income and standard of living have significant relationship with students' academic achievement, such that students from middle to upper class families tend to outperform those from less advantaged background. This assertion was supported by Grissmer (2003), Teese (2004) and Sharma (2004). This means the family background and context of a child affect his/her reaction to life situations and level of performance. This is because the family lays the psychological and moral foundations in the overall development of the child while Musgrave (2000), stated that a child that comes from an educated home would like to follow the steps of his/her family and by this, work actively in his/her studies. Similar results were found by Teese (2004), in his analysis of the students' performance where he found clear and consistent trends for children from lower socio-economic background. Coleman (1998) stated that the relationship between socio-economic disadvantage and learning outcomes has been accepted almost as an article of faith by educators. This was supported by the Children's Defence Fund (1995) "Year Book" on the State of America's children which made the following observations:

- In 1993, there were 15.7 million poor children in the United States. This was the highest number in 30 years;
- The inflation-adjusted median income of young families with children declined to 34% between 1973 and 1992;

- In 1992, 66.2% of the children who lived in a family headed by a person who dropped out of school were in poverty. Poverty rates for other levels of education were as follows: high school graduates, 40.2%; some college graduates, 22.4%; and university graduates, 7.5%.
- In 1993, almost one in every seven children, 9.4 million, had no health insurance. This represented an increase of 800,000 from 1992; and
- The birth rate among unmarried teens was 15.5 births per 1,000 in 1959. The figure in 1992 was 44.6.

From the above “Year Book”, the economic factor which refers to family characteristic is the most powerful predictor of school performance. Careful consideration of the socio-economic status of parents revealed that the higher the standard of living of the parents, the higher the academic performance of the child. These relationships have been documented in countless studies and seem to hold, no matter what measure of status is used (occupation of principal bread winner, family income, parents’ education or a combination of these).

Again, literature review revealed that apart from socioeconomics background another factor that can affect the student’s performance is the age at which a mother gives birth to the child. According to Moore (1993), income, family size and the mother’s age at child birth were modestly related to students’ academic achievement. This implies that early age or old age has its significance in student’s academic achievement. Hayes and Bronzaft (2006) contend that factors such as the mother’s age at birth of the child, number of siblings, genetics and environment have more to do with academic achievement. Moore (1993) opined that early birth has been disadvantageous to a young mother’s children as well as the woman herself. One key reason is that early childbearing interferes with the process of schooling and human capital development which means that the mother’s ability to gather resources will be reduced. She is therefore likely to be poorer than a woman who delays childbearing. For this reason, he concludes that the age at first childbirth may prevent a teenage mother from providing resources that promote cognitive development, such as a high-quality child-care arrangement and a stimulating home environment that can improve a child’s academic performance especially in Mathematics.

William and Chelser (2005) view the mother as the first child educator and the age at which she gives birth to the child matters in her life. This allows her to have a stable or unstable mind which affects the mother’s instinct and love towards the child. Ninio (2009) and Benjamin (2013) observed that mother’s age enhances the cognitive development of her child. According to Brooks-Gunn and Chase- Lansdale (2001), young mothers are socially and emotionally immature; we would expect them to have limited parenting ability. They said further that coping with the demands of an infant is likely to be far more challenging for a teenager than for an older woman. Inconsistent and arbitrary discipline which is more common among young mothers has a negative impact on children’s behaviour and on their social and emotional development. As a result, Brooks-Gunn and Chase-Lansdale (2001), expect a young age at first birth to adversely affect children’s social and emotional adjustment. Even if a teenage mother has additional children when she is older, she may continue the patterns of parenting she established with her first child. Teenage mothers also tend to provide their children with less cognitive stimulation and less emotional support than do older mothers.

Psychological factors may also be involved since many teenage pregnancies are unplanned, unwanted or discovered late. Thus, a pregnant teenager may lack the emotional

maturity to take responsibility for a pregnancy even after she has decided to carry it to term. All these affect the composition of the child's brain which eventually affects the academic performance of the child. William and Decoufle (2009) asserted that teenage pregnancy is a multifaceted problem with no single cause or cure. According to them, for a teenager, pregnancy comes at a time when her physical development is incomplete and available support systems may be limited. Again, pregnancy interrupts her education and makes it tremendously difficult for her to complete the developmental tasks of adolescence as well as those related to pregnancy and parenthood; all these affect the academic achievement of the child.

Brooks-Gunn and Chase-Lansdale (2001) compared the birth outcomes of teenage mothers and older mothers and concluded that the teenage mothers are most likely to be at risk both biologically and socially for poor birth outcomes. This is because the older mothers are more likely to be married and to have a wanted pregnancy which makes them psychologically balance than the teenage mothers who have unplanned pregnancy and who are likely to be undereducated or live in areas with limited access to resources and services. In another related study, Rothenberg and Varga (2011) found that scores on a global measure of parenting were lower for the homes of children of teenage parents than for the homes of other children.

Delayed childbearing poses its own biological risks, such as an increased likelihood of medical conditions like hypertension and diabetes which in turn may affect the brain composition of the child leading to congenital aberrations like hydrocephaly (mental retardation resulting from accumulation of fluid in the brain); micro-cephaly (mental retardation associated with a small skull and brain) and down's syndrome which are common with mothers over 35years especially when the mother has not borne her first child at that age and these may eventually affect the child's academic achievement. They therefore concluded that psychologically, the best time to have a child is probably between the ages 22 and 29. Several studies (Frazer, Brockert and Ward, 2004; Lee, Ferguson and Corpuz, 2008; Wadsworth, Osborn and Taylor, 2012) indicate that young age by itself is not a risk factor for poor outcome of children from young mothers, but those young mothers who are from lower socioeconomic backgrounds may eventually leave their children in the hands of grand mothers who do not understand much about education.

Brooks-Gunn and Fursternberg (2010) concurred that young mother is at higher risk for social and economic disadvantages than her teenage counterpart who is not pregnant and lives in the same social environment. According to them, being forced into adult roles before completing adolescent developmental tasks cause a series of events that affects the teenage mother's entire life. These events may result in a prolonged dependence on parents, lack of stable relationships, and lack of economic and social stability. In addition, many teenage mothers drop out of school during their pregnancy. This tendency may have as much to do with low academic achievement and low academic commitment as it does with the pregnancy. This is because many teenage mothers never completed their education and lack of education reduces the quality of jobs available to these individuals which in turn affects the academic achievement of their child.

Frazer, Brockert and Ward, (2004) asserted that childbearing at an early age is a strong predictor for need for assistance, especially in lower socioeconomic groups and when the pregnant teenage family will not support her. Schooling is critical to a young woman's prospects throughout her life and the amount of schooling a woman obtains affects her occupation, her income, her chances of marriage, her risk of poverty and welfare dependence, and more generally, the quality of her own life and that of her children. Failure to be self-supporting

logically follows lack of education and lost of career goals. In general, children of teenage mothers are found to be at a developmental disadvantage compared to children whose mothers were older at the time of their birth.

Statement of the Problem

Observations and reports from examining bodies like WAEC, NECO and JAMB revealed that a high percentage of secondary school students persistently perform poorly in Mathematics examinations. This poor performance is likely to be caused by many factors but this study sought to investigate the extent to which age of the mother at birth of the child, parents' education and parents' occupation jointly caused variation in Mathematics achievement of secondary school students in Ogun State, Nigeria.

Hypothesis

- There is no joint and relative effect of parents' education, occupation and real mother's age on students' academic achievement in Mathematics in Ogun State, Nigeria.

METHODOLOGY

Research Design

The study is a non-experimental type and an ex-post facto research design was adopted.

Population

The target population for this study comprised all the senior secondary school one students (SSS 1) in Ogun State. The choice of this group of students was based on the assumption that majority of the students would be able to read printed materials with little assistance from the researchers and that the students would have completed their course contents in Junior Secondary School three (JSS 3) Mathematics curriculum. This was considered important because the achievement test will reflect the JSS 3 Mathematics curriculum as a unit.

Sample and Sampling Technique

The sample of the study was 2,400 students from 60 secondary schools in nine local government areas (LGAs) of Ogun State, Nigeria. The sample was selected using the multi-stage sampling procedure. At the first stage, nine local government areas were purposively selected from twenty local government areas in Ogun State. At the second stage, the stratified random sampling technique was used to select a total of 60 senior secondary schools from 147 senior secondary schools in the 9 local government areas selected in Ogun State, Nigeria and this represented a total of 40 per cent of the entire schools in the nine local government areas selected. At the third stage, simple random sampling technique was employed to select a total of 40 SS1 comprising male and female students from each of the participating schools.

Instrumentation

In order to collect data and test the hypothesis, two research instruments namely 'Students' Questionnaire (SQ) and Students' Mathematics Achievement Test (SMAT)' were developed and employed by the researchers in order to gather data. Under the students' questionnaire (SQ) instrument, the researchers created three sections for measuring variables that related to the students. These are: (a) Demographic Data; (b) Parents' Qualification and (c) Parents' Occupation.

Demographic Data: The demographic data questionnaire was designed to collect information from the students on the following items: (i) School name; (ii) Type of school; (iii) School location; (iv) Gender; (v) Age; (vi) Class; and (vii) Mother's age at the birth of the child. The item which addressed the issue of mother's age at birth of the child was calculated by subtracting the age of the child from the age of the mother to get the real age of the mother at the birth of the child. The mother's age was grouped into three categories-young teenage mother (age 11-19 years), mid-age group (ages 20-35) and older mothers (ages above 35 years).

Parents' Qualification: The students were asked to provide only the highest qualification of their parents. The issue of parents' qualification was given a score ranging from zero (0) to 11, where 0 was awarded to no schooling and 11 to Ph.D. parent. Thus, a minimum score of zero and a maximum score of 22 was given to the parents.

Parents' Occupation: This section obtained information about the occupational levels of the parents of each student. The parents' occupations were given scores from one to seven, where one was awarded to parents that were farmers and seven was awarded to parents that were in professional and managerial occupations, thus giving a minimum score of two and a maximum score of fourteen.

Students' Mathematics Achievement Test (SMAT): To measure the achievement of students in the subject, a Mathematics Achievement Test (MAT) was developed by the researchers using a table of specifications to generate 20 items out of the 50 items formerly prepared for students' Mathematics tasks. This is a multiple-choice objective test, made up of 40 items with four options A, B, C and D. Each item has one correct option (the key) and three distracters. The correct option attracts 1 mark and the total mark obtainable is 20. Kuder Richardson formula 20 was used to establish the internal consistency of the instrument.

Validity of the Instruments

For the purpose of this study, both the face and content validity of the instruments were ensured. To ensure validity of the instruments, the initial drafts of the instruments were scrutinised by four experts in questionnaire and content construction who were required to check for all non-technical flaws in the instruments. Such inputs enhanced a thorough validation in order to ensure that the instruments actually measured what they were intended to measure in relation to the research hypothesis. Based on the suggestions and comments of these experts, the necessary corrections were made and the final version of the instruments was trial tested on a sample of 50

students who were not part of the real study sample, in Ijebu-Ode LGA of Ogun State, Nigeria. The data collected showed that the students did not have problems responding to the items in the questionnaire.

Reliability of the Instruments

In computing the reliability of this research instruments, Cronbach’s alpha (α) was utilised in estimating the reliability coefficient. The scores for each item were encoded in SPSS software. The Cronbach alpha reliability of the instruments was established as $SQ = 0.87$ while the reliability of the test was estimated as 0.84. The construct, content and criterion related validities were found to be adequate.

Data Collection Procedure

The necessary data for this study were obtained from students of the selected schools in the selected local government areas. After collection of data, questionnaire responses without corresponding responses to achievement tests were discarded. The idea was to have complete sets of the students’ related instruments. 2,400 copies of the questionnaire were distributed to the selected students in the 60 schools in the 9 local government areas and a total of 2,317 (96.5%) questionnaire were returned, among which 366 (15.3%) badly filled ones were discarded. A total of 1951 (81.2%) questionnaire, fully responded to, were utilized and data collection lasted for 28 working days.

RESULTS

H_{01} : There is no joint and relative effect of parents’ education, occupation and real mother’s age on students’ academic achievement in Mathematics in Ogun State, Nigeria.

Table 1: Joint and relative effect of parents’ education, occupation and real mother’s age on students’ academic achievement in mathematics in Ogun State, Nigeria

| R | Adjusted R ² | F | Sign | Variables | Beta | t | Sign |
|-------|-------------------------|-------|-------|---------------------|--------|--------|-------|
| 0.066 | 0.003 | 2.875 | 0.035 | Parents’ Education | -0.046 | -1.774 | 0.076 |
| | | | | Parents’ Occupation | 0.030 | 1.144 | 0.253 |
| | | | | Real Mother’s Age | -0.008 | -0.373 | 0.709 |

Table 1 shows R (0.066) with adjusted R² (0.003) which shows that only 0.3% not up to 1.0% of the variance in academic achievement is jointly accounted for by the three independent variables. The f-value (2.875) which is significant at 0.05, ($p < 0.05$) indicates that though the percentage joint effect is small, the effect is still significant on academic achievement. The beta values – 0.046, 0.030 and -0.008 for parents’ education, parents occupation and real mother’s age respectively shows that parents’ education has the highest effect or predicts students’ academic achievement most, followed by parents’ occupation and real mother’s age the least. But while parents’ occupation has positive effect on students’ academic achievement, both parents’

education and real mother's age have negative effect on it. None of the variables has significant relative effect on achievement.

DISCUSSION AND CONCLUSION

The result in Table 1 reveals that parents' education has significant influence on the academic achievement of students in Mathematics. This is because parents' education has highest effect or predicts students' academic achievement in Mathematics most. This observation provides the evidence that students of educated parents might performed better than students of uneducated parents in Mathematics achievement. The findings lend support to the results of Musgrave (2000) and Grissmer (2003) which reported that parents' level of education was the most important factor affecting students' academic achievement.

The results in Table 1 also reveal that parents' occupation is next to parents' education that predicts academic achievement in Mathematics. The result provide evidence that students whose parents belong to the high ranking occupational status might have better grade in Mathematics than their counterparts whose parents belong to the low ranking occupational status. This is because parents with high ranking occupational status might have enough income which can be used to provide the needed materials and support for their children in order to arouse their interest in Mathematics than their counterparts in low ranking occupation whose major obligation is to provide shelter and food for the family. The finding was supported by that of Simon (2004), Teese (2004) and Sharma (2004).

With respect to the effect of age of mother at birth of the child and the child's academic achievement in Mathematics; Table 1 shows that the effect of mother's age on students' academic achievement in Mathematics had the least effect among the home background variables which exerted significant effects on students' academic achievement in Mathematics. Additionally, the result shows that the effect of mother's age at birth of the child and the child's academic achievement in Mathematics is very low and this indicates that in the face of other home background variables, its effects are very minimal.

The implication of this however is that the age at which a mother gives birth to her child may contribute to low maternal education, unmarried status and/or poverty factor with known, large, negative effects on educational disabilities. This finding was supported by that of Moore (1993), Brook-Gun and Chase- Lansdale (2001), Hayes and Bronzaft (2006), William and Decoufle (2009), Frazer, Brockert and Ward (2004) all agreed that maternal age does not directly influence the achievement of students in Mathematics, it may have an indirect effect through the intermediate socio-demographic factors such as maternal education.

Recommendations

From the findings of this study, the following recommendations were reached:

- Given that the present study is limited to senior secondary schools in Ogun State, similar studies could be carried out in other parts of the country to affirm or refute the conclusion reached.
- Since parents education influences students' academic achievement in Mathematics, the government and all stakeholders in education sector should endeavour to implement its

policy on basic education for all and thus create an enlighten society in which every parent would be educated enough to have a positive influence on their children especially in their attitude towards Mathematics which in turn would lead to better achievement in the subject.

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