Students' Perceptions of Factors Influencing Academic Achievement in Mathematics in Makurdi Metropolis of Benue State, Nigeria

NYITSE Mark Ph.D[1], **ANZAA Jonathan Tyodaa,** Ph.D[2]

ADEWUNI David Adebayo Ph.D[3] & **OJO Michael Bamidele** Ph.D[4]

DAJOT Aaron Enock[5]

Department of Educational Foundations, Federal University, Kashere, Gombe State[1]
Department of Educational Foundations, Nasarawa State University, Keffi, Nasarawa State[2&5]
Department of Educational Foundations, Federal University Lokoja, Kogi State, Nigeria[3]
Department of Educational Foundations and Early Childhood Education[4]
Emmanuel Alayande University of Education, Oyo, Oyo State, Nigeria.

Corresponding Author: ADEWUNI David Adebayo Ph.D

Abstract

The study investigated students' perceptions of factors influencing academic achievement in Mathematics in Makurdi metropolis of Benue State. The study was guided by two research questions and one hypothesis. The researchers adopted descriptive survey design for the study. The study focused on 20 senior secondary schools in Makurdi metropolis which have a total population of 8750 male and female students. A sample of 360 students, comprising 180 male and female students was selected using stratified random technique. The instrument for collecting data was developed by the researchers and validated. The reliability of the instrument was determined by adopting Cronbach alpha statistics, and reliability index of 0.87 was obtained. Means and standard deviations were used in answering research questions, while t-test was used to test the null hypothesis at 0.05 level of significance. The findings of the study showed that, failing to attend Mathematics lessons regularly can lead to students' low scores in Mathematics; spending less time in studying Mathematics, and long absences from school can lead to students' failure in Mathematics, among other factors. It was therefore recommended, among others, that parents and teachers should encourage students to attend Mathematics lessons regularly, students should spend much time on studying Mathematics, and more teachers should be trained and retained in Mathematics to fill the gap of qualified Mathematics teachers.

Keywords: Students, perceptions, factors, academic achievement, mathematics

Introduction

Mathematics as a subject is conceptualised as a mother of science. This implies that any student who is aspiring to become a scientist must be knowledgeable in the subject. Also, students who want to take up science-based professions such as medicine, engineering, pharmacy, nursing and architecture, to mention just a few must perform well in Mathematics. This is reflected in their Mathematics achievement which is measured as scores obtained in tests or examinations.

In Nigeria, high scores in Mathematics in external examinations like West African Examinations Council (WAEC) and National Examinations Council (NECO), for example is mandatory and prerequisite for studying science-based courses. It is therefore not surprising that curriculum developers and time-table planners have accorded Mathematics special preference above other subjects, except English Language. It is allocated double periods and appears on the school timetable every morning from Monday to Friday. Disappointingly, the performance of students in Mathematics in Makurdi metropolis is not encouraging. Thus, researchers, parents, teachers, government and students are worried and want to know factors influencing students' achievement in Mathematics.

Many studies, not in Makurdi metropolis, have shown that there are arrays of factors influencing Mathematics achievement. According to Sakurai (2013) and United Nations Children Education Fund (UNICEF, 2013), many children have difficulty in accessing education due to certain factors such as health and nutrition, as well as competing family and work commitments that may prevent them from attending school regularly. Besides, malnutrition and food security continue to be critical risk factor for many children in accessing education (WHO, 2013). It should be noted, however, that academic achievement of students in Mathematics will be enhanced if the optimal health related barriers are low. In other words, students' ill-health and malnutrition can lead to increase in school absences which may likely affect Mathematics achievement.

Also, work is another critical factor. For example, Sakurai (2013) argued that children in sub-Saharan Africa are noted for working at high rates than children in any other continent. Research also has shown some children combine work with schooling, that 20 percent of children are engaged in work while attending schools, and another 18 percent work but do not attend schools (UNICEF, 2013). Nonetheless, one should note that these statistics represent an underestimate of children's actual experiences as they focus only on formal labour but do not include household chores. Similarly, socio-cultural practices and beliefs about gender roles, which allocate more domestic chores to girls, continue to affect family's decisions about who should be sent to school (Everson, 2012; Anzaa, 2013; Anzaa& Nwosu, 2018). This implies that students who share their time in formal labour or domestic chores with studying Mathematics are not likely to perform well in Mathematics.

Studies have shown that proper guidance from parents and teachers has positive influence on students' academic achievement in Mathematics. Nonetheless, other studies have shown that apart from proper guidance, there are also other factors which influence mathematic achievement. According to Odiembo and Simatwa (2014), the factors include; family income, parental education; school attendance, teacher-student ratio, presence of trained teachers, sex of students, and distance from school. Besides, research in Britain showed that schools have independent effects on students' attainment (Spark 2013). Spark (2013) revealed that students from independent private schools are likely to achieve higher examination scores. Spark argued that though school related factors are important, there is an indirect link to socio-economic status (SES) as private schools are more likely to have a greater number of students from high SES families, select students with stronger academic abilities, and have greater financial resources as compared with the public schools. In addition, according to sparks, school effect is also likely to operate through variation in the quality and attitudes of teachers. He further explained that teachers at disadvantaged schools often hold low expectations of their students, which compound the low expectations students and their parents may also hold.

In addition, level of truancy or unexplained absence is another factor that may likely influence students' academic achievement in Mathematics. Similarly, studies have shown that students from rural schools are more likely to have lower educational outcomes in terms of academic achievement in Mathematics, and retention rates than students from urban schools (Kazeen et al, 2010). According to Kazeen et al (2010), research from Australia showed that despite adequate number of educational facilities in the rural schools, students from these schools remained disadvantaged by other factors. This means that availability of adequate educational facilities in schools alone is not a guarantee that students can perform well in Mathematics, other factors such as costs, availability of transport, levels of family support and education should also be considered. Also, inequity exists with regard to quality of education that rural students receive, often as a result of restricted and limited choice. All these are likely to influence students' academic achievement in Mathematics.

Uya (2013) stated that students' characteristics have been also identified as another factor. These characteristics, according to Uya, include: spending time in studying Mathematics; doing Mathematics assignments; attending Mathematics class regularly; students' attitudes towards Mathematics; self-concept and motivation; health and nutritional status. Uya further argued that regardless of intelligence, students who spend more time on assignments and home work are more likely to improve their grades, that amount of time students invest in homework are more likely to improve their grades, that amount of time students invest in homework and other related activities have been found to be strongly related to their achievement.

Gender plays significant roles in Mathematics achievement. For example, it is documented in the literature that the main factors associated with the gender gaps in

Mathematics include issues of masculinities, classroom practice and attitudes to learning Mathematics expressed by boys and girls in which boys rated their attitudes more positively than girls, that boys were more confident than girls in doing Mathematics. Bosede (2015), corroborated that gender-biased curriculum, poor teaching methods and classroom practices, lack of appropriate guidance and counselling of students particularly girls; lack of encouragement and motivation of girls to pursue Mathematics are among other factors.

Statement of the Research Problem

The abysmal performance of students in Mathematics examinations in Makurdi metropolis is worrisome and has become serious concern of the governments, researchers, teachers, parents and students. Many studies attribute this to series of factors such as students ill-health, malnutrition that lead to absences from school, teachers' and students' characteristics, gender inequity and lack of proper counselling of students among others. Though many factors have been identified by various researchers, the problem still persists. It seems male and female students' perceptions of factors influencing academic achievement in Mathematics may likely contribute to finding solution to the problem especially in Makurdi metropolis. However, this has not been done in Makurdi metropolis. As a result of this, the researchers are motivated to investigate students' perceptions of factors influencing academic achievement in Mathematics in Makurdi metropolis, Benue State.

Purpose of the Study

The general purpose of the study was to investigate students' perceptions of factors influencing academic achievement in Mathematics in Makurdi metropolis. Specifically, the study is designed to achieve the following objectives:

1 Investigate male students' perceptions of factors influencing academic achievement in Mathematics.
2 Ascertain female students' perceptions of factors influencing academic achievement in Mathematics.
3 Find out the difference between male and female students' perceptions of factors influencing academic achievement in Mathematics.

Research Questions

The following research questions were raised to guide the study:

1 What are the male students' perceptions of factors influencing academic achievement in Mathematics?
2 What are the female students' perceptions of factors influencing academic achievement in Mathematics?

Research Hypothesis

One hypothesis was formulated and tested at 0.05 level significance to guide the study.

Ho: *There is no significant difference between male and female students' perceptions of factors influencing academic achievement in Mathematics in Makurdi metropolis*.

Methodology

The study adopted descriptive survey design because according to Hale (2011), this design could be used where the respondents are allowed to answer questions through questionnaire or interview. The study focused on 20 senior secondary schools, which have a total population of 8750 male and female students. A sample of 360, comprising 180 male and female students each was selected through stratified random technique.

The researchers developed a structured questionnaire, titled, Factors Influencing Academic Achievement in Mathematics (FIAAM). The questionnaire has two parts (A & B). Part A contains the bio-data of the respondents, while part B contains 16 items developed to elicit information from the respondents on factors influencing academic achievement in Mathematics. This section of the questionnaire is based on four-point Likert Scale format of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The questionnaire was validated by two experts in measurement and evaluation from the Department of Educational Foundations, Nasarawa State University, Keffi. The reliability of the instrument was determined by conducting pilot-test on 30 students who did not form part of the sample. Adopting Cronbach alpha statistics, the reliability index of 0.87 (87%) was obtained.

The researchers and research assistants teamed up for data collection, and 100 percent of the questionnaire administered was retrieved. In analysis of data, means and standard deviations were used to answer research questions, while t – test statistics was used to test the null hypothesis at 0.05 level of significance the data collected were subjected to SPSS for analysis.

Results

The results of the data analysis were presented in tables and explained as follows:

Research Question 1: What are the male students' perceptions of factors influencing academic achievement in Mathematics?

Table 1: Means and standard deviations (SD) of male students' perception of factors influencing academic achievement in Mathematics

Item	Statement	No	Mean	SD
1.	Failing to attend Mathematics lesson regularly can lead students to score low in Mathematics	360	2.59	1.00
2.	Spending less time in studying Mathematics can lead students to score low grades in Mathematics	360	2.96	1.10
3.	Lack of qualified Mathematics teachers can lead students to score low grades in Mathematics	360	2.56	1.10
4.	Long absences from school can lead students failure in Mathematics	360	3.2	0.69
5.	Lack of Mathematics textbooks can result in students' low scores in Mathematics	360	3.19	0.91
6.	Telling students Mathematics is a difficult subject may result in their low scores	360	3.09	0.92
7.	Praising students for answering Mathematics questions can result in better scores	360	2.90	1.16
8.	Spending much time in studying Mathematics can lead to students' better scores	360	3.21	0.94
9.	Attending Mathematics lesson regularly can improve students' scores in Mathematics	360	3.41	0.77
10.	Constant practice in solving Mathematics problems can improve students' scores in Mathematics	360	3.21	0.69
11.	Poor previous results in Mathematics examinations can lead to low scores in Mathematics	360	2.90	1.16
12.	Good teacher-student relationship can improve students' scores in Mathematics	360	2.90	1.16
13.	Students who spend much time on domestic chores may likely have low grades in Mathematics	360	3.3	0.65
14.	Students from poor home environment are likely to have lower grades in Mathematics	360	2.56	1.01
15.	Students from poor home environment are likely to have lower grades in Mathematics	360	2.80	1.15
16.	Use of Mathematics textbooks is likely to improve students' scores in Mathematics	360	3.60	0.98
	Cluster mean		**3.02**	**0.96**

Table 1 indicates that all the 16 items have mean above 2.50 cut off point, and also cluster mean of 3.02. This means that all the 180 male students perceived the factors investigated as influencing academic achievement in Mathematics in Makurdi metropolis of Benue State

.

Research question 2: What are the female students' perceptions of factors influencing academic achievement in Mathematics

Table 2: Means and standard deviations (SD) of female students' perceptions of factors influencing academic achievement in Mathematics

Item	Statement	No	Mean	SD
1.	Failing to attend Mathematics lesson regularly can lead students to score low in Mathematics	360	3.71	1.92
2.	Spending less time in studying Mathematics can lead students to score low grades in Mathematics	360	3.83	1.95
3.	Lack of qualified Mathematics teachers can lead students to score low grades in Mathematics	360	3.70	1.92
4.	Long absences from school can lead to students' failure in Mathematics	360	3.81	1.95
5.	Lack of Mathematics textbooks can result in students' low scores in Mathematics	360	3.69	1.92
6.	Telling students Mathematics is a difficult subject may result in their low scores	360	3.83	1.95
7.	Praising students for answering Mathematics questions can result in better scores.	360	3.70	1.92
8.	Spending much time in studying Mathematics can lead to students' better scores	360	3.83	1.95
9.	Attending Mathematics lesson regularly can improve students' scores in Mathematics	360	3.72	1.92
10.	Constant practice in solving Mathematics problems can improve students' scores in Mathematics	360	3.83	1.95
11.	Poor previous results in Mathematics examinations can lead to low scores in Mathematics	360	3.68	1.91
12.	Good teacher-student relationship can improve students' scores in Mathematics	360	3.82	1.95
13.	Students' ill-health can lead to low scores in Mathematics achievement	360	3.72	1.93
14.	Students who spend much time on domestic chores may likely have low grades in Mathematics	360	3.71	1.91
15.	Students from poor home environment are likely to have lower grades in Mathematics	360	3.84	1.95
16.	Use of Mathematics textbooks is likely to improve students' scores in Mathematics	360	3.86	1.96
	Cluster mean		**3.77**	**0.96**

Table 2 indicates that all the 16 items have mean above 2.50 cut-off point and also cluster mean of 3.77. This means that all the 180 female students perceived the factors investigated as influencing academic achievement in athematics in Makurdi metropolis of Benue State.

Testing of Hypothesis

Ho: *There is no significant difference between male and female students' perceptions of factor influencing academic achievement in Mathematics in Makurdi metropolis*

Table 3: t- test analysis showing male and female students' perception of factors influencing academic achievement in Mathematics

S/N	Perceptions	No	Mean	SD	t- test	df	P-value	Level of Sig.
1	Male	180	3.02	0.96	2.86	358	0.04	0.05
2	Female	180	3.77	1.94	2.45			

Table 3 indicates that the P-value (0.04) at 2df is less than 0.05 level of significance. Thus, the null hypothesis is rejected. This means that there is significant difference between male and female students' perceptions of factors influencing academic achievement in Mathematics in Makurdi metropolis of Benue State.

Discussion of Findings

The main purpose of the study was to investigate male and female students' perceptions of factors influencing academic achievement in Mathematics. Specifically, the study investigated male students' perceptions of factors influencing academic achievement in Mathematics, ascertained female students' perceptions of factors influencing Mathematics achievement positively and negatively. The study also determined whether there is significant difference between male and female students' perceptions of factors influencing academic achievement in Mathematics.

The analysis of data collected for the study revealed that one of the notable factors, influencing Mathematics academic achievement is students spending more time on domestic chores. This finding resonates with Sakurai (2013) who found that children in sub-Saharan Africa combine work with schooling. He pointed out that 20 percent of children are engaged in work, while 18 percent work but do not attend schools. This is influenced by socio-cultural practices and beliefs which place more values on work than schooling and families tend to allocate more work to girls, and this continue to affect their decision as who should go to school (Everson, 2012; Anzaa, 2013; Anzaa & Nwosu, 2018). This implies that students who share their study time with work and schooling are likely to score low in mathematic tests or examinations. Thus, the finding of the study showed that irregular class attendance is one of the factors responsible for abysmal students' performance in Mathematics.

Besides negative influence of some factors on students' academic achievement in Mathematics, there are positive ones. For example, the findings of the study revealed that male and female students perceived positive factors to include: praising students for answering Mathematics questions, spending much time in studying Mathematics,

attending Mathematics lessons, good teacher-student relationship, and use of Mathematics textbooks. These findings resonate with Uya (2013) who found that factors which influence Mathematics achievement positively are: spending much time in studying Mathematics lessons.

Determining the difference between male and female students' perceptions of factors influencing academic achievement in Mathematics, the finding showed that there is significant difference in perceptions between male and female students. This implies that gender plays significant roles in Mathematics achievement. For example, Studies have shown that the main factors associated with the gender gaps in Mathematics include issues of masculinities, classroom practices and attitudes to learning Mathematics expressed by boys and girls in which boys rated their attitudes more positively than girls, that boys were more confident than girls in doing Mathematics. Bosede (2015) corroborated that gender-biased curriculum, poor teaching methods and classroom practices, lack of appropriate guidance and counselling of students particularly girls, lack of encouragement and motivation of girls to pursue Mathematics, are among other factors. These could be some of the reasons for the difference in male and female students' perceptions.

Conclusion

Male and female students perceived missing many Mathematics lessons, spending less time studying Mathematics, and spending more time doing domestic chores, among others, as factors influencing academic achievement in mathematics. Nonetheless, there is a significant difference between male and female students' perceptions of factors influencing academics achievement in Mathematics. This difference could be attributed to different attitudes of male and female students towards Mathematics.

Recommendations

Based on the findings of the study, the researchers recommended that: teachers and students should avoid missing Mathematics lessons, students should spend much time studying Mathematics and less time in doing domestic chores.

References

Anzaa, J. T. & Nwosu, N. P. (2018). Impact of economic recession and gender on parental decision about their children access to school: A case of Keffi Metropolis. *Nigerian Journal of Sociology of Education, xii (1)119 – 129.*

Anzaa, J.T. (2013). *Socio-cultural practices and beliefs in tiv as correlates of girl-child education*. Unpublished Ph.D thesis, Department of Educational Foundations, University of Nigeria Nsukka.

Bosede, E.R. (2015). Gender differences in mathematics and retention scores. A case of problem based learning method. *International Journal of Research in Education and Science* (IJRES), 1(1), 45 – 50.

Everson, E. (2012). *States of girl education in Africa: Achievement since 2000, challenges and prospects for the future*. http://efc.indenet.net/publications/state%20girls%20Education%25West%Africa_ENG.pdf.

Hale, J. (2011). *The 3 basic types of descriptive methods. http://psychcentral.com/bio/archives/2011/09/2*

Kazeem, A., Jensen, L. & Stokes, C.S. (2010). School attendance in Nigeria: Understanding the impact on intersection of gender, urban-rural residence and socio-economic status. *Comp.Edu.Rev*, 54(2) 295 – 31

Odiembo, E.A. & Simatwa, M.W. (2014). The relationship between secondary school mathematics teacher age, gender and students' academic achievement in Kenya: A case study of Muhoroni Sub-country. *Educational Research*, 5(7) 225 -240.

Spark, S. (2013). *Segragating boys and girls improves education. http://www.ed.week.org/ew/articles2013/01/16/17/gender.h32.html.*

Sakurai, R. (2013). *Child labour and education for all. Educational International*. http://downloadei-ie.org/site%20Discovery/child/about%20Educational%20Group/Doc/child%20Labour%20and%20EFAEN.pdf

UNICEF, (2013). *Ghana at a glance: Statistics*. http://www.unicef.org/intoby%20country/ghana.statistics.html.Google%20scholar.

Uya, S.M. (2013). Factors affecting mathematics performance of junior high school students. *International Electronic Journal of Mathematics Education, 15(1) 1 – 13*.

WHO, (2013). *Child health, World Health Organisation Regonal Office for Africa*. http://www.afro.who.int/eb/clusers-a-programmes/frh/child-and-adolscent_health/programme-components/childhealth.hmtl.