

**INFLUENCE OF SCHOOL TYPE AND GENDER ON STUDENTS’
PERFORMANCE IN MATHEMATICS IN DAMATURU EDUCATION ZONE,
YOBE STATE, NIGERIA**

BY

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Abstract

This study was carried out to investigate the influence of school type and gender on students’ performance in Mathematics in Damaturu Education Zone, Yobe State, Nigeria. The population of the study comprised 1, 887 senior secondary two (SSII) students in eight public and private schools in Damaturu education zone registered for 2021/2022 academic session with 983 male and 904 female students. The research used an ex-post- facto research survey design and through simple random sampling procedure, the sample size of 241 was drawn for the study. The instrument used for data collection was Mathematics Performance Test (MPT) made up of 40-item multiple choice questions constructed by the researcher and validated by experts in the field of Mathematics education, Measurement and evaluation. The Reliability index of MPT was 0.85 computed using Kuder-Richardson 20 (KR-20) formula. Two research questions were stated to guide the study while two null hypotheses were formulated and tested at 0.05 level of significance. In terms of data analysis, data obtained were analyzed using means, standard deviations and Z-test statistics. Based on the findings, it was found that there is significant influence (difference) in the mean performance of students in public and those in private secondary schools in Mathematics Performance test, students in private schools performed better than those in public schools ($p < 0.05$). The result also revealed that there is significant influence (difference) in the mean performance of students in Mathematics test; female students performed better than male counterparts ($p < 0.05$). The study recommended among others that government should raise the standard of public schools to the level of private schools where the students performed better in Mathematics than students in public schools by providing facilities and personnel. In co-educational schools, teachers should peer both male and female students in solving Mathematics problems or tasks in order to avoid gender differences in Mathematics achievement.

Keywords: School Type, gender, students’ performance, Mathematics

Introduction

In Nigeria and other nations of the World where emphasis is on technological development and Mathematics is needed for this technological development to take place. According to Azuka (2012), linking Mathematics to development and progress through Science and Technology, Mathematics has a relationship with development and progress of any nation as shown: Mathematics -to- Science -to- Technology -to- Development and Progress. In line with this relationship between Mathematics, Science and Technology, Harbor- Peters (2002) said that Mathematics remains the fulcrum on which any real science can rest and no real science can succeed without undergoing mathematical expression; that any nation that wants to develop technologically begins by developing her mathematical arts right from the classroom. It is this significance of Mathematics that made Ukeje in Onah (2004) and Igbokwe (2003) to say that in absence of Mathematics, there will be no science; in the absence of science, there will be no modern technology, and in absence of modern technology, there will be no modern society. The consequence of this statement is that there could be no actual development, technologically without a consistent development in Mathematics. This means that a strong base in Mathematics is vital in the nation's building. This is not surprising hence the curiosity of West Africa Examination Council (WAEC), parents, Mathematics teachers, educationist and government in finding solutions to the problems affecting the teaching and learning of Mathematics in secondary schools.

Despite the significance of Mathematics as a core subject in the nation's secondary schools curriculum, Mathematics students' achievement is consistently very poor and with low average in Senior School Certificate Examination (SSCE), (WAEC, 2017-2021). The Mathematics students' achievement at the SSCE from 2017 to 2021 has pointed out that the percentage of students that passed at credit level and above (A1-C6) in Mathematics was consistently less than 50% and this has not been encouraging. This poor achievement of students in Nigeria over the years has become a major source of concern to all holders in the educational sector (Nwadinigu & Azaka, 2012). There is mass failure in students' achievement in both West Africa Senior Secondary Certificate Examination (WASSCE) and the National Examinations Council (NECO) (Dawa, Adamu & Olayomi, 2005). Tukur (2007) opined that the students' poor achievement in Mathematics could be attributed to several issues such as ineffective instructional materials, poor teaching procedures and instructional

materials used by Mathematics teachers and lack of preparedness by the students, policy makers by the government, learning environment, ownership of schools and the process of evaluation. In view of this, the shareholders in educational sector agree that the huge investment on education is not yielding the desired dividend.

In the context of this study, school type is defined as the controlling force in terms of the management of the school and it is divided into two types which include public and private schools. Schools that are set up (established) and managed by governments are called public schools while those set up by individuals, Missions and organizations are referred to as private schools (Oguche, 2011). Public schools could be traced back to the missionaries' activities in setting up missionary school which is virtuously for religious goal.

Private involvement in education could be substantiated as a result of breakdown of the public school infrastructures and void in educational sector due to falling level of infrastructure and facilities, the abandonment of government and the low morale of public schools teachers caused by lack of structural welfare from the government with non-payment of salaries. The breakdown of the public educational sector which reflects the falling standard of education in Nigeria with a significant influence on students' achievement gives an easy involvement of the private schools which serve as a favour for the falling standard of education. Some publicly owned schools which are branded by failed physical dilapidated building and teachers with outdated information, lack of planning and non-motivated teachers will have a negative influence on students' achievement as they may not be able to compete with their private counterparts. This assumption is inconclusive on the achievement of the students in public schools; some students still do better against their private counterparts despite all the challenges being faced.

Also, private schools which serve as a correction of the failed public schools tend to aid students' learning and hence influence the achievement of students by making available a conducive learning environment for the students and thus having a positive influence on their achievement. The only concern against the advent of private schools is their rate of fees which could be seen as outrageous compared to virtually free education in public schools. Regarding the above, Lynn (2014); Sexton (2015); Okon and Archibong (2014) opined that private schools are well equipped with better basic facilities, students are exposed to good study habits, adequately staffed, and highly motivated to study in a conducive learning environment compared to public schools. Whatever be the advantages of these private

schools, there are some private secondary schools that employ and maintain poorly paid staffs who thereby feel dissatisfied. This may have adverse influence on the overall achievement of such schools.

Researches in the area of school type on Mathematics students' achievement and science at the basic levels made Adomako (2005); Asante (2005); Olasehinde and Olatoye (2014); Olatoye and Agbatogun (2009) to demonstrate that the achievement of private school students has continued to be far better than that of public schools. In the same vein, available statistics on schools according to Council for American Private Education (CAPE, 2004), showed that students' achievement in standardized tests was higher in private schools than public schools. Researchers (Umodikawu, 2016; John, Godfrey, Abotuyure and Awaligewa, 2016; Muhammad and Maitama, 2018) in their separate studies revealed that there is significant difference between public and private school students' achievement which favours private school students.

Similarly, in the context of this study, gender refers to the boys and girls in senior secondary two (SSII). Gender has been identified as a main variable that affects students' achievement in science examinations and Science, Technology and Mathematics endeavor (Omiko, 2017). Gender difference in Nigerian educational system and the World at large is attributed to social cultural and traditional reasons (Wasagu & Muhammad, 2009). Wasagu and Muhammad further maintain that gender is determined by the conception of tasks, functions and roles attributed to women and men in the society and in public and private life. Oni (2014) posited that women are being marginalized while men are given higher opportunities to advance based on their science background. In Nigeria educational system, this factor has been found to offer male students an unfair advantage over their female counterparts specifically in Mathematics as a course of study in Tertiary education. Alabi (2014) observed that more males select science courses in high schools than females, particularly Mathematics, Physics, Biology and Chemistry. This is because of the view from the public domain that women are weaker vessels who cannot withstand Mathematics. Alabi further maintains that women are hindered from progressing through discrimination on the basis of gender, early marriage and child bearing and based on this, they are deprived quality education, job opportunities and incapacitated and rendered passive generally in the society. Researches related to gender on students' achievement in Mathematics have revealed very true differences between male and female students (in favor of male students) (Tukur, 2015;

Chebet, 2016; Sule & Musa, 2018; Belah, Arsay & Selvan, 2015; Alex & Mammen, 2014; Muhammad, Frooq & Rabia, 2016). On the other hand, Justice, Ebo and Paul (2013), Oludipe (2012), Kola and Taiwo (2013) in their different studies revealed that there is no significant difference between male and female students' achievement. However, based on the prior studies, findings remain inconclusive and the influence of school type and gender have not been stabled on students' achievement, this calls for constant inquiry of the influence of school type and gender on students' performance in Mathematics.

Purpose of the Study

This study investigated the influence of school type and gender on students' performance in Mathematics in Damaturu Education Zone, Yobe State, Nigeria. Hence, the present study sought to find answers to the following research questions:

1. How does school type (whether public or private) influence students' performance in Mathematics?
2. How does gender (male and female) influence students' performance in Mathematics?

Methodology

The present research investigated the influence of school type and gender on students' performance in Mathematics was designed as an ex-post-facto survey design. According to Büyüköztürk, Çakmak, Akgün, Karadeniz and Demirel (2010), ex-post-facto is a design aimed at establishing possible causes and effects for behavior pattern by comparing subjects in whom it absents to a lesser degree. This research design was considered appropriate for the fact that independent variables such as school type and gender have already occurred and no manipulation would be done on them to establish the level of cause or influence and effect relationship of the dependent variable(s) such as students' performance in Mathematics. The senior secondary two (SSII) students in eight public and private schools in Damaturu education zone who registered for 2021/2022 academic session were the participants of the research. There were a total of 1,887 students with 983 males and 904 females from the senior secondary schools in Damaturu education zone. Through multi-stage sampling procedure, the sample size was drawn from the research participants and used for the research. The sample size for the research consisted of 241 students, 108 in public and 103 in private schools and with a total of 131 male and 110 female students in Damaturu education zone, Yobe State, Nigeria.

The first stage involved the use of stratified sampling technique to select school type (whether public or private school) that is; 4 public and 4 private schools from Damaturu education zone which resulted to 8 schools altogether. In this case, for example, in Damaturu zone, there are 9 public schools which the researcher intends to select four schools, the researcher wrote the names of all the 9 public schools on pieces of paper with equal size and squeezed them into balls and dropped inside a bag and shuffled them. Then four were picked at random. Those four picked would be the effective sample. The same technique was used to sample the required number of private schools in this zone. The third stage involved the use of proportionate sampling technique to sample 7 classes.

The last stage involved the use of simple random sampling technique to sample the required number of students per school. In this case, schools were grouped into public and private. For example, in a school with 67 students which the researcher intends to select 34 students, the researcher simply cut out 67 pieces of paper with equal size. The researcher wrote 'Yes' on 34 pieces of paper and 'No' on the remaining 33 pieces of paper, and squeezed the pieces of paper. The researcher then dropped the pieces of paper in a bag and shuffled them together. The researcher then asked students to pick just once (without replacement). Those that picked the 34 'Yes' would be the effective sample from this school. The same technique was used to sample the required number of students in private school. The same procedure was adopted to sample the required number of males and females in a mixed class in various schools involved. This simple random sampling technique was employed in 7 classes that resulted to 131 males and 110 females. These figures (131 and 110) brought the manageable number of sampled subjects to 241 used for the study. This constituted 20% or less of the total population of the study. The rationale for the choice of this sample size is in conformity with Nwana in Eze (2008) who stated that if population of the study is in many tens, 20% or less will do, in a few hundreds, a 40% or more sample size will do and in many hundreds, a 20% sample size will do.

The present research used an instrument for data collection named "Mathematics Performance Test (MPT)". The researcher obtained the data for the research during the first term of the 2021/2022 academic session. The Mathematics Performance Test (MPT) was a 40-item choice question. Each item has 5-options A-E, the test items were developed from Algebra, Geometry and Trigonometry concepts of Mathematics based on senior secondary II curriculum by the researcher to obtain data with respect to the influence of school type and

gender on students' performance in Mathematics. The 40 items were marked and scored (one "1" mark for each correct answer and zero "0" for each wrong answer). In the areas of the validity and reliability, the instrument was subjected to content and face validity by Mathematics educators and those in measurement and evaluation. Also, the reliability index of 0.85 was established using Kuder-Richardson 20 (KR-20) formula. The rationale for the choice of KR-20 was due to the fact that the instrument was administered to participants once and the items were dichotomously marked and scored. The MPT was administered with the help of research assistants (Mathematics teachers) from the various schools involved.

After the data had been obtained from the field survey through the administration of the instrument used for data collection, the analysis of data for the research followed. For the research, the procedures of data analysis included descriptive and inferential statistics. Descriptive statistics sought to describe or analyze the data collected while inferential statistics sought to draw inference (conclusion). Particularly, descriptive statistics of means and standard deviations were used to analyze the data while Z-test was used for two unrelated samples regarding the same variable to determine whether the difference between the two means is statistically significant at $\alpha = 0.05$ level.

Results

The Influence of School Type on Students' Performance in Mathematics

The results of the z-test carried out to investigate if the school type has a significant influence in the mean performance of students in Mathematics are shown in Table. How does school type (whether public and private) influence students' performance in Mathematics?

Table 1

Results of Z-test on the Performance Mean Scores of Students in Mathematics with Respect to School Type

School Type	N	Mean	SD	df	Z-cal.	Sig.	Decision
Public	138	21.43	5.21	239	11.05	.001	Reject H ₀
Private	103	25.05	10				
Total	241						

In Table 1, the performance mean scores of students in Public schools was 21.43 with SD =5.21, while that of students in Private schools was 25.05 with SD = 10.21. The mean difference between the students attending Public and Private schools stood at 3.62 as

computed. Similarly, the calculated Z-value of 11.05 (df= 239) is significant at $p= 0.001$ which is also significant at 0.05 since $p<0.05$. This implies that there is significant influence (difference) in the mean performance of students in public and those in private secondary schools in Mathematics Performance test. Hence, the mean difference of 3.62 that favors students in private is significant and it shows that the students in private schools performed better than those in public schools.

The Influence of Gender on Students’ Performance in Mathematics

The results of the z-test carried out to examine if the Gender has a significant influence in the mean performance of students in Mathematics Performance test are shown in Table. How does gender (male and female) influence students’ performance in Mathematics?

Table 2

Results of Z-test on the Performance Mean Scores of Students in Mathematics with Respect to Gender.

Gender	N	Mean	SD	df	Z-cal.	Sig.	Decision
Male	131	19.57	7.61	239	4.86	.003	Reject H ₀
Female	110	34.13	10.65				
Total	241						

In Table 2, the performance mean score of male students in Mathematics was 19.57 with SD =7.61, while that of female students was 34.13 with SD = 10.65 in that order. The mean difference between the male and female students equally stood at 14.56 as computed. However, the calculated Z-value = 4.86 with df= 239 at $\alpha= 0.05$ and p- value = 0.003. Since p-value of (0.003) is less than 0.005 set as level of significance, this signifies that there is significant influence (difference) in the mean performance of male and female students in Mathematics Performance test. The inference drawn is that the mean difference (14. 56) that favors female students is significant and it shows that female students performed better than male counterparts.

Discussion

This study sought to investigate the influence of school type and gender on students’ performance in Mathematics in Damaturu Education Zone, Yobe State, Nigeria. The findings

of this study revealed that there is significant influence (difference) in the mean performance of students in public and those in private secondary schools in Mathematics Performance test, students in private schools performed better than those in public schools. This finding agrees with the findings of Olasehinde and Olatoye (2014); Olatoye and Agbatogun (2009) who in their various studies proved that the achievement of private school students was far better than that of public schools. This finding is also in line with the available statistics on schools according to Council for American Private Education (CAPE, 2004), that the students' achievement in standardized tests was higher in private schools than public schools. This finding further corroborates with the earlier findings of the researchers (Umodikawu, 2016; John, Godfrey, Abotuyure & Awaligewa, 2016; Muhammad & Maitama, 2018) who in their separate studies revealed that there is significant difference between public and private school students' achievement in favour of private school students. The better performance recorded by the private school students could be attributed to the views of Lynn (2014); Sexton (2015); Okon and Archibong (2014) who opined that most of the private schools are well equipped with better basic facilities, students are exposed to good study habits, adequately staffed, and highly motivated to study in a conducive learning environment compared to public schools. From the researcher's view, these factors encourage students from private secondary schools to perform better than those in public secondary schools.

The findings of this study also revealed that there is a significant influence (difference) in the mean performance of male and female students in Mathematics Performance test; female students performed better than their male counterparts in Mathematics. This finding supports the view of Ugwu (2011) who argued that females are now working hard to fight the suppression, oppression, and domination by their male counterparts in Mathematics. However, this finding contradicts the earlier findings of Tukur (2015); Chebet (2016); Sule and Musa (2018); Belah, Arsay and Selvan, (2015); Alex and Mammen (2014); Muhammad, Frooq and Rabia (2016) who in their separate studies revealed a significant difference between male and female Mathematics students' achievement (in favour of male students). Similarly, this finding is further contradicted by Justice, Ebo and Paul (2013); Oludipe (2012); Kola and Taiwo (2013) in their different studies revealed that there is no significant difference between male and female Mathematics students' achievement. Therefore, the better performance recorded by the female students could be accounted for by their spatial ability and judgment, and the other is problem solving which include the recall, combination

and application of relevant knowledge to a problem or task. Another possible reason for better performance by female students could be that, they had a strong affinity towards Mathematics than male counterparts.

Conclusion

This study has therefore investigated the influence of school type and gender on students' performance in Mathematics in Damaturu Education zone, Yobe State, Nigeria. Conclusively, there is a significant influence (difference) in the mean performance of students in public and those in private secondary schools in Mathematics Performance test, students in private schools performed better than those in public schools. The study also revealed that there is a significant influence (difference) in the mean performance of male and female students in Mathematics Performance test; female students performed better than their male counterparts in Mathematics.

Recommendations

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

1. Government should raise the standard of public schools to the level of private schools where the students performed better in Mathematics than students in public schools by providing facilities and personnel.
2. In co-educational schools, teachers should peer both male and female students in solving Mathematics problems or tasks in order to avoid gender differences in Mathematics achievement.

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