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Assessing the Impact of School Type, Gender and Age on Attitude and Mathematics Achievement of Senior Secondary School Students

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Abstract

The focus of the study is to assess the impact of school type, gender and age on attitude and mathematics achievement of senior secondary school (SSS) students in Lagos State, Nigeria. A survey research design was used in the study. Twenty-four randomly selected SSS comprised of twelve public and twelve private schools were used in the study. Randomly selected seven hundred and twenty (720) SSS two students were involved in the study. 'Mathematics Achievement Test' (MAT) and 'Students Attitude Scale' (SAS) with Kuder Richardson (KR-20) and test-test reliability coefficient of 0.85 and 0.87 respectively were used to obtain data for the study. T-test and Analysis of Variance (ANOVA) statistics were used to analyse the data collected. Findings revealed that the significant difference exist between public and private SSS students' achievement and attitude in Mathematics. Besides, the significant difference existed in the SSS students' attitude towards mathematics based on gender and achievement in Mathematics based on age. It was recommended that government should provide adequate instructional materials that can enhance the achievement of students in mathematics.

Keywords: Students, Mathematics Achievement, Attitude, Public Schools, Private Schools

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Introduction

Mathematics is one of the compulsory subjects for all secondary school students in Nigeria. It is a tool for national development and scientific advancement. Odili, (2006) defined Mathematics as a body of knowledge, methods, and the output of human activity to solve problems. Odumosu, Oluwayemi and, Olatunde (2012) observed that all aspects of science make use of mathematical concepts to discuss their concepts, principles, theories, and models.

Students' poor attitude towards learning mathematics and its effect on students' performance in Mathematics has been a serious concern and interest of researchers. Different scholars who believe that male students perform better in Mathematics than female students which in turn has a negative effect on female students' attitude towards Mathematics (Meelissen & Luyten, 2008). The result from Farooq and Shah (2008), Mohd et al, 2011; Kogce, Idiz, Aydin, & Altindag, (2009) studied revealed that the confidence of boys and girls towards Mathematics at secondary school level are not significantly different. However, many research studies revealed that students have an averagely positive attitude towards mathematics (Tezer & Karasel, 2010; Lianghuo, Seng, Yen, Mei, Pereira-Mendoza & Yee, 2005). However, Alimi, Ehinola, and Alabi (2012) reported that the academic performance of students in public and private SSS in Ondo State is not significantly different.

Despite the relevance of Mathematics, students in SSS performance are not encouraging nor improving. Okodoko and Samuel (2011), Fatade, Morgari, and Angbabu, (2013) reported the poor performance of students in Mathematics at Senior School Certificate Examinations. Efforts by the stakeholders, including the government towards finding lasting solutions, yielded no result. Therefore, there is a need to examine the factors that are responsible for the consistent failure rate which has been a major problem in the education industry. Thus, the researcher investigated the impact of school type, gender and age on attitude and mathematics achievement of SSS students in Lagos State, Nigeria.

Hypotheses

Researchers formulated six hypotheses for this study. These are:

H_{01}: School type will not have a significant difference in SSS students' achievement in mathematics in Lagos State.

H_{02}: School type will not have a significant difference in SSS students' attitude towards mathematics in Lagos State.

H_{03}: Gender will not have a significant difference in SSS students' achievement in mathematics in Lagos State.
H_{04}: Gender will not have a significant difference in SSS students' attitude towards mathematics in Lagos State.
H_{05}: Age will not have a significant difference in SSS students' achievement in mathematics Lagos State.
$H_{06:}$ Age will not have a significant difference in SSS students' attitude towards mathematics in Lagos State.

Methodology

A descriptive research design was adopted for the study. Survey research was chosen because the researchers used questionnaires and a test to collect useful data from the respondents in the study. All SSS students in Lagos State, Nigeria constituted the study population. SSS 2 students in all the six educational districts of Lagos State were used as the target population. The hat and draw sampling technique was used to select twenty-four (24) SSS (12 public and 12 private schools) from the six educational districts. From the sampled schools, the researchers randomly selected seven hundred and twenty (720) students for the study.

Researchers' designed questionnaires titled 'Mathematics Achievement Test' (MAT) and 'Students Attitude Scale' (SAS) were used to collect. MAT consisted of 30 items multiple-choice objective test with four options for each item while SAS contained 15 items. To ascertain the validity of the MAT and SAS, researchers gave the instruments to two lecturers in the Department of mathematics and two measurement and evaluation lecturers. Kuder Richardson (KR-20) and test-test were used to determine the reliability for MAT and SAS with 0.85 and 0.87 reliability co-efficient respectively. T-test and Analysis of Variance (ANOVA) statistics was used to analyse the data collected.

Results

The summaries of the t-test, Analysis of Variance, and post hoc tests are presented in Tables 1 to 7.

H_{01}: School type will not have a significant difference in SSS students' achievement in mathematics in Lagos State.

Table 1
Summary of the t-test Analysis on School Type and Students' Achievement in Mathematics

School type	N	Mean	SD	df	T	Sig.
Public	360	36.69	6.09			
				718	-5.01	0.00
Private	360	38.67	4.40			

Table 1 above shows that the t-value of -5.01 on the impact of school type on SSS students' achievement in mathematics in Lagos state is significantly different. It reveals that students' school type has a significant difference in their mathematics achievement with private school having the higher mean of 38.67.

H_{02}: School type will not have a significant difference in SSS attitude towards mathematics in Lagos State

Table 2
Summary of the t-test Analysis on School Type and Students' Attitude towards mathematics

School type	N	Mean	SD	df	T	Sig.
Public	360	38.73	7.81			
				718	-10.15	0.03
Private	360	44.62	7.76			

Table 2 above reveals that the t-value of -10.15 on the impact of school type on SSS students' attitude towards mathematics in Lagos state is significantly difference. This indicates that the stated hypothesis two is not accepted. It means that school type has a significant difference in secondary school students' attitude towards mathematics in Lagos State.

H_{03}: Gender will not have a significant difference in SSS students' achievement in mathematics in Lagos State

Table 3
Summary of t-test Analysis on Gender and Students' Achievement in Mathematics

Gender	N	Mean	SD	df	T	Sig.
Male	381	37.77	5.08			
				718	0.45	0.00
Female	339	37.59	5.74			

Table 3 above reveals that the t-value of 0.45 on the impact of gender on SSS students in mathematics in Lagos state is significantly different. Hence, hypothesis three is rejected. It means that gender has a significant difference in the SSS students' mathematics achievement with the male students with a higher mean of 37.77.

H_{04}: Gender will not have a significant difference in SSS students' attitude towards mathematics in Lagos State

Table 4
Summary of t-test Analysis on Gender and Students' Attitude towards Mathematics

Gender	N	Mean	SD	df	T	Sig.
Male	381	41.01	7.64			
				718	-2.29	0.00
Female	339	42.42	8.97			

It was shown from the above table 4 that the t-value of -2.29 on the impact of gender SSS students' attitude towards mathematics in Lagos state is significant different Therefore, hypothesis three is not accepted. It reveals that the attitude of SSS students towards mathematics on the basis of gender is significantly different.

H_{05}: Age will not have a significant difference in SSS students' achievement in mathematics Lagos State.

Table 5
Summary of ANOVA on Students' Mathematics Achievement Based on Age

Source	TSS	df	MS	F	Sig.
Corrected model	1185.94	5	237.19	8.55	0.00
Intercept	888698.82	1	888698.82	32018.13	0.00
School type	670.89	1	670.89	24.17	0.00
Age	462.67	2	231.33	8.33	0.00
School type *Age	15.27	2	7.64	0.28	0.76
Error	19817.87	714	27.76		
Total	1043428.00	720			
Corrected total	21003.80	719			

Table 5 above shows that students' mathematics achievement based on school type (F-value = 24.17 and age (F-value = 8.33 are significantly different when each of these variables is considered separately. However, the result also reveals that the F-value of 0.28 for the interaction of school type and age on students' mathematics achievement is not significant. Hence, hypothesis five is accepted.

Post Hoc Test

Table 6
Scheffe Post-hoc Analysis on Age Differences in Mathematics Achievement

Age	N	Subset for alpha =10.05	
		1	2
16-17 years	195	36.4821	
14-15 years	373		37.88
18 years above	152		38.73
Sig.		1.00	

The post hoc analysis conducted for age revealed that 18 years above with the highest mean of 38.73 and 14 – 15 years with the mean of 37.88 are in one subset while 16 – 17 years with the mean of 36.48 is in the other subset.

H_{06}: Age will not have a significant difference in SSS students' attitude towards mathematics in Lagos State.

Table 7
Summary of ANOVA on Students' Attitude Based on Age

Source	TSS	df	MS	F	Sig.
Corrected model	6504.28	5	1300.86	21.44	0.00
Intercept	1078583.69	1	1078583.69	17778.98	0.00
School type	5302.97	1	5302.97	87.41	0.00
Age	113.62	2	56.81	0.94	0.39
School type age	134.79	2	67.39	1.11	0.33
Error	43315.67	714	60.67		
Total	1300320.00	720			
Corrected total	49819.95	719			

Table 7 above reveals that the F-value of 87.41 for school type is significantly different while the F-value of 0.94 for age in not is significantly different. The result indicates that students' attitude towards mathematics based on school type is significantly differ but students' attitude towards mathematics based on age is not significantly different. Also, the result reveals that the F-value of 1.11 for the interaction of school type and age on students' attitude towards mathematics is not significant. Hence, hypothesis six, which states that public and private secondary school students' attitude towards mathematics will not be significantly different based on age is upheld.

Discussion

The results of the study show that school type has a significant difference in SSS students' achievement in mathematics. It showed that students from public and private schools differ significantly in their mathematics achievement. The findings disagree with the study of Alimi, Ehinola, and Alabi (2012) but agree with the study of Philias and Wanjobi (2011).

The study discovered that public and private SSS students' attitude towards mathematics is significantly different. It means that private and public school students differ significantly in their attitude towards mathematics. The result is supported by Mensah, Okyere & Kuranchie, (2013) research study. Also, male and female SSS students' mathematics achievement differs significantly. The result is supported by the result of Olutola (2016) research study.

Besides, the study revealed that SSS students are significantly different in their attitude towards mathematics based on school type and the result is supported by Raimi and Adeoye (2002). Moreover, the result in hypothesis five showed that public and private SSS students are different significantly in their mathematics achievement based on age. Farooq and Shah (2008) do not support these findings.

The result in hypothesis six also revealed that public and private SSS students are different significantly in their attitude towards mathematics based on age. The result is not in agreement with Vella (2011) quantitative study.

Conclusions

The researchers discovered that the predictor factor of students' achievement in mathematics is the attitude which must be taken into

consideration by all the partners in the educational sector to improve the performance of students in this compulsory subject in SSS.

Recommendations

The researchers recommended that:

- School counsellors should organize seminars for students on the importance of mathematics to arouse their positive attitude towards learning mathematics.
- Government should provide adequate instructional materials that can enhance the achievement of students in mathematics.
- Government should provide instructional materials that could be used to stimulate students' positive attitude towards learning mathematics.

References

Alimi, O. S., Ehinola, G. B. and Alabi, F. O. (2012). School types, facilities and academic performance of students in senior secondary schools in Ondo State, Nigeria. *International Education Studies*, (5), 3. 44-48.

Farooq, M. S. and Shah, S. Z. U. (2008). Students' attitude toward Mathematics. *Pakistan Economic and Social Review*, 48(1), 75-83.

Fatade, A.O, Mogan, D, Angbabu, A.A, (2013). Effect of problem based learning or senior secondary school students' achievements in further mathematics. *Acta Didactica Nawacensia*, 6(3), 27-44.

Kogce, D., Y, Idiz, C., Aydin, M & Altindag, R., (2009). Examining elementary school students' attitudes towards Mathematics in terms of some variables, *Procedia Social Behavioural Science*, 1 (1), 291-295.

Lianghuo, F., Seng, Q. K., Yan, Z., Mei, Y. S., Pereira-Mendoza, L., & Yee, L. P. (2005). Assessing Singapore students' attitudes toward mathematics and mathematics learning: findings from a survey of lower secondary students. In *3rd East Asia Regional Conference on Mathematics Education, Shanghai, China*.

Meelissen, M. and Luyten, H. (2008). The Dutch gender gap in mathematics: Small for achievement, substantial for beliefs and attitudes. *Studies in Educational Evaluation* 34(2), 82-93.

Manoah, S. A., Indoshi, F. C. & Othuon, L. O. A. (2011). Influence of attitude on performance of students in Mathematics curriculum. *Educational Research*, 2(3), 965-981.

Mensah, J. K., Okyere, M., & Kuranchie, A. (2013). Student attitude towards Mathematics and performance: Does the teacher attitude matter? *Journal of Education and Practice*, 4(3), 132-139.

Odili, G. A. (2006). Mathematics in Nigeria secondary schools: A teaching perspective. *Lagos Rex Charles and Patrick Limited*.

Odimou, M. O., Oluwayemi, M. O., & Olatunde, T. O. (2012). Mathematics as a tool in Technological acquisition and Economic Development in Transforming Nigeria to Attain Vision 20: 2020. In *Proceedings of Annual Conference of the Mathematical Association of Nigeria* (pp. 199-207).

Okodoko, D., & Samuel, J. (2011). Evaluating the Implementation of NTI/NCE Mathematics Programme by Distance Learning System. *Journal of Educational and Social Research, 1*(5), 69-69.

Okwo, F. A., & Otunba, S. (2007). Influence of gender and cognitive styles in science achievement in physics essay test. *Journal of Science Teachers Association of Nigeria*, *42*(1-2), 85-88.

Olutola, A.T. (2016). School Location and Gender as Predictors of Students' Performance in WASSCE Multiple Choice Test in Biology. *Liceo Journal of Higher Education Research*, 12 (1), 1-16.

Philias, O. Y. and Wanjobi, W. C. (2011). Performance determinants of Kenya certificate of secondary education (KCSE) in mathematics of secondary schools in Nyamaiya Division, Kenya. *Asian Social Science, 7* (2), 107-112

Raimi, S. A. & Adeoye, F. A. (2002). Gender difference among college students as determinant of performance in integrated science. *African Journal of Educational Research, 8 (1&2), 41-49.*

Tezer, M. & Karasel, N. (2010). Attitudes of primary school 2nd and 3rd grade students towards mathematics course. *Procedia Social and Behavioural Sciences, 2, 5808-5812.*

Vella, D. (2011). *Students' attitudes towards Mathematics and its relationship to achievement gender and age* (Bachelor's thesis, University of Malta). Retrieved on 11/12/2021 from https://www.um.edu.mt/library/oar/handle/123456789/3742