

## ***Influence of students' religiosity on their academic achievement in Mathematics in Calabar Metropolis of Cross River state, Nigeria***

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### **Abstract**

*This study investigated influence of students' religiosity on their academic achievement in Mathematics in Calabar Metropolis of Cross River state, Nigeria. Two hypotheses were formulated to direct the study and literature was reviewed on the variables under study. Ex-post facto research design was adopted for the study. A total sample of 621 students, out of 3,105 SS2 students, was selected using stratified and simple random sampling procedures. A questionnaire titled "Students' religiosity" (SR), and Mathematics achievement test were the main instruments used for data collection. The reliability estimate of the instrument was established through Cronbach Alpha, and reliability estimate of .72 was established for the SR; while for students' achievement test in Mathematics, the reliability was established through Kuder Richardson formula K-R20 which gave .74. ANOVA and independent t-test were adopted to test the two hypotheses at .05 level of significance. The result of the analysis revealed that students' religiosity and gender significantly influence their academic achievement in Mathematics. Based on this finding, it was recommended, among others, that continuous students' religious practices and commitment are to be encouraged to enhance their academic achievement in Mathematics.*

**Keywords:** Religiosity, gender, academic, achievement, mathematics

## **Introduction**

Mathematics is the bed rock of science and technology which contributed to the development of nations of the world. The study of Mathematics gratifies a wide range of interest and abilities, in making crucial contribution to the understanding and appreciation of the world. Mathematics as a school subject is fashioned to provide mathematical knowledge, understanding and skills to diverse students, irrespective of their background and religious affiliation (Jeynes, 2010). However, it is worthy to note that in spite of the great position that Mathematics occupies in human lives as well as its significant role in the scientific and technology advancement of a nation, it remains a subject for which students' performance over the years, (especially between the eighties to present time) have been deplorable and miserable (Nenty, 2010). This has led to fallen standard of education in Nigeria. In view of this, various attempts have been made by students, parents, teachers, among others, in Nigeria to ensure high academic achievement in Mathematics among students. Some of these attempts include the act of organizing extra classes for students by teachers, parents spending extra monies on their children's education, and government increasing teachers' salaries to motivate them to give their best. Notwithstanding these, it appears some students continue to perform below average in educational institutions in Nigeria. It is a source of worry to many stakeholders, especially parents whose wards find themselves in this situation. One of the most significant factors responsible for students' poor academic performance is their religion (Villarroel, 2001).

Religiosity refers to one's religion, belief, practices, experiences, identities and attitudes (Jones, & Sheffield, 2009). Religiosity serves as a springboard for the inculcation and improvement of socio-cultural values which are fundamental to actualizing correct human behavioural patterns particularly as they relate to productivity and nation building. Thus, this could influence students' academic achievement in Mathematics either negatively or positively. According to Richard (2011), religion helps to teach students morals, values, discipline and even culture, which may help to enhance their academic achievement in schools. The religiosity of the students may influence their decision to abstain from church or home directly based on messages they listen to at their place of worship. Students who are more religious may have a higher likelihood of adjusting to the values and norms of their place of worship. This could help to influence their academic achievement in Mathematics. Jeynes (2002) reported that "religious practice and religious commitment each has a positive effect on academic achievement including reading and mathematics tests and school-related behaviour" (p.27). Similarly, Regenerus and Elder (2003) reported that students reporting high religiosity attained higher scores on standardized mathematics and reading tests than those students who reported no religious commitment. Moreover, Loury (2004) found that more religiously committed students performed better on most academic measures than their counterparts with less religious

commitment. Shermer (2003) found that religiosity is negatively correlated with educational attainment. Zubairu and Sakariyau (2016) examined the association between religiosity and academic performance and found no significant correlation between religiosity and academic performance among students enrolled at the International Islamic University, Malaysia (IIUM). However, a closer examination of the results revealed that students at IIUM possessed high levels of religiosity as well as high levels of academic performances. Richard's (2007) study explored the relationship between religiosity and academic success in first-year college students. The study employed qualitative methods of data collection and analysis to accomplish this purpose. The finding of the study shows that the knowledge of religiosity plays a significant role in academic success of first-year college students in Mathematics.

Ning and Murphy (2018) examined the effects of religious affiliation and religiosity on students' performance using a sample of 740 students comprising faiths spanning 5 major religions in the United States. They found a positive interaction effect on performance for Christianity and religiosity, no interaction effect on performance for Judaism, Buddhism, and Hinduism, and a negative interaction effect on performance for Islam and religiosity. Conclusively, religiosity significantly influences students' academic achievement in mathematics. Students' religiosity has also been shown to increase academic achievement and lower the achievement gap for under-represented students (Jeynes, 2003; Jeynes, 2010). Religiosity impacts students' view of education, including their type of mindset and degree of persistence. In addition to mindset, religion and spirituality have been found to motivate students and increase academic achievement (Jeynes, 2003; Jeynes, 2010; Richard, 2011). Derrico, Tharp and Schreiner (2015) found religiosity as an essential quality for students' success and prolonged academic engagement. Similarly, Mvududu and Larocque (2008) found that greater intrinsic religious motivation was associated with a more positive attitude toward Mathematics and students who practiced religion reported less anxiety and had more motivation in studying Mathematics. This implies that educating the whole person and not ignoring elements of religiosity can have positive academic implications for student's development. Religiosity, particularly Christianity, changed the people's attitudes toward their environment and increased their academic achievement. In addition to those positive effects among the disadvantaged, religiosity has also been found to help close the achievement gap. In a meta-analysis of 28 quantitative studies, Jeynes (2010) measured elements that tried to close the achievement gap and found religiosity to have significant influence on students' academic achievement. In a large longitudinal survey study of over 18,000 students, Jeynes (2003) found that religious students achieve at higher levels academically and outperform their less religious counterparts.

Gender is one of the factors that have considerable effects on students' academic performances especially in Mathematics and science subjects irrespective of their religiosity and background. Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (female and male) population (Flynn, 1998). Rusillo and Arias (2004) examined gender differences in academic motivation of secondary school students in Mathematics, and found no gender differences in academic self-concept, in intrinsic motivation, in success-related attributions and in performance attained in Mathematics, but with girls showing lower levels of extrinsic motivation, taking more responsibility for their failures. Nenty (2010) examined the analysis of some factors that influence causal attribution of Mathematics Performance among Secondary School Students in Lesotho and found gender of students to have no significant influence on students' attribution of their performance in Mathematics.

Atovigba, Micheal, O'Kwu and Emmanuel (2012) examined gender trends in Nigerian Secondary School Students' Performance in Algebra. A posttest only experimental study was carried out which randomly selected 100 senior secondary 2 students from two schools in Makurdi, Benue State, made up of 50 males and 50 females who were treated to completion of squares method of solving quadratic equations. The students were thereafter examined using the Quadratic Equation Roots Test (QERT) instrument. The result of the analysis using independent t-test shows significant difference in mean performance of males and females students in Mathematics. The male students performed significantly higher than the female students.

Abdu-Raheem (2012) investigated the influence of gender on secondary school students' academic performance in South-West, Nigeria. The results of 2003/2004 to 2007/2008 West African School Certificate Examinations (WASCE) were collected on various subjects including Mathematics from 10 Secondary Schools selected from 5 States in South-West, Nigeria. The sample consisted of 2,305 students. Stratified random sampling was used to select 2 schools from each state. Purposive sampling was used to collect the WASCE results of students sampled. Chi-Square was used to test 5 hypotheses raised. The result of the analysis, amongst others, revealed that male students performed better than their female counterparts in Mathematics and Science subjects irrespective of their religion. Wordu and Iwok (2018) examined the influence of gender and learning environment on students' academic achievement in Mathematics in Akwa Ibom State. A descriptive survey design was adopted. The results of the analysis using t-test statistics showed a significant influence of gender on students' academic achievement in senior secondary school Mathematics irrespective of their religious affiliation.

## **Research Questions**

1. How does students' religiosity influence their academic achievement in Mathematics?
2. To what extent does students' gender influence their academic achievement in Mathematics?

## **Hypotheses**

The following null hypotheses were formulated to guide the study:

**Ho1:** Students' religiosity does not significantly influence their academic achievement in Mathematics.

**Ho2:** There is no significant influence of students' gender on their academic achievement in Mathematics.

## **Methodology**

The study area was Calabar Metropolis of Cross River State, Nigeria. The research design used for this study was the ex-post facto design. The population for the study consisted of all the senior secondary II (SS2) students in Calabar Metropolis which comprises of Calabar South and Calabar Municipality Local Government Areas (LGAs). There are twenty-four (24) public secondary schools and three thousand, one hundred and five (3,105) SS2 students which comprise of 1,356 male and 1,749 female students. A multi-stage sampling technique, involving stratified, proportionate and simple random sampling techniques, was adopted in selecting 621 SS2 students which made up of 271 males and 350 females for the study. The stratified random sampling technique was based on gender and local government areas. The population of students was divided into 2 strata based on the two Local Government Areas. Each strata were sub-divided into two groups based on gender (male and female). The names of the schools were written on pieces of paper and folded into ball-like shapes. The paper balls were poured into a container and mixed properly. A small boy who did not know what the exercise is meant for was invited to pick one piece of paper at a time, without replacement until the 12 schools were selected out of the total number of paper-balls in the container. The schools whose names appeared on the picked pieces of paper were used for the study. 50% of schools were selected from each Local Government Area. Out of a total of 24 public secondary schools, 12 (50%) schools were randomly selected for the study. From the selected schools in each local government area, 20% of the total number of students was selected using proportionate sampling technique; thus giving a total sample of 621 SS2 students for the study.

Two instruments were used for data collection, including a questionnaire on students' religiosity and Mathematics achievement test. The questionnaire titled "Student Religiosity" consisted of two sections: A and B. Section A described the bio data of the respondents which include gender while section B was developed on the main

variable which consisted of items 1-8 eliciting information on student's religiosity. The questionnaire was based on four-point scale used in measuring respondents' level of agreement or disagreement such as Strongly agree (4-points), Agree (3-points), disagree (2-points) and Strongly disagree (1point). Mathematics achievement test consisted of 50 items constructed by the researchers based on SS2 syllabus; this was used to test students' ability in Mathematical tasks. Correct answer was scored 1-mark while incorrect answer was scored 0-mark. The instruments (questionnaire and achievement test in Mathematics) were face-validated by two experts in Measurement and Evaluation and two Mathematics Educators, both from the University of Calabar. Corrections were pointed out by the experts and adjusted by the researchers and the document was considered valid. The reliability estimate of the questionnaire was established through Cronbach Alpha method which gives .72 for students' religiosity while Students' Mathematics achievement test reliability was established through Kuder Richardson formula K-R20 which gave .74. The statistical package for social sciences (SPSS) computer programme was used to analyze the data collected. The hypotheses were tested using One Way Analysis of Variance (ANOVA) for hypothesis one while independent t- test was used for hypothesis two.

### **Presentation of results**

The results of the analysis are presented in the relevant tables. The hypotheses were tested at .05 level of significance.

**Ho1:** Students' religiosity does not significantly influence their academic achievement in Mathematics.

The independent variable in this hypothesis is students' religiosity (categorized as High, Average and Low), while the dependent variable is students' academic achievement in Mathematics. Based on this categorization, one-way analysis of variance (ANOVA) test statistics was employed in testing the hypothesis based on their academic achievement in Mathematics. The result of the analysis is presented in Table 1.

**Table 1:** One-Way Analysis of Variance on influence of students’ religiosity on their academic achievement in Mathematics

<b>Religiosity</b>	<b>N</b>	<b><math>\bar{x}</math></b>	<b>SD</b>		
Low	205	15.26	3.91		
Average	175	18.32	4.10		
High	241	20.65	4.23		
Total	621	18.21	4.19		
<b>Sources of variation</b>	<b>SS</b>	<b>df</b>	<b>MS</b>	<b>F-value</b>	<b>P-value</b>
Between group	2312.213	2	1156.107		
Within group	33516.121	618	54.233	21.317	.000
Total	35828.334	620			

The result of analysis in Table 1 ( $F=21.317$ ;  $p=.000$ ) indicated that the null hypothesis was rejected at 0.05 level of significance while the alternate was upheld. This implies that there is a significant influence of students’ religiosity on their academic achievement in Mathematics. The result also shows that the mean score of students with high religiosity is higher, followed by students with average religiosity, and followed by students with low religiosity. This implies that the more religious they are, the better their academic achievement in Mathematics. Also the lesser their religiosity, the poorer their academic achievement in Mathematics. A post hoc multiple comparison test was used and the result is presented in Table 2.

**Table 2:** Fisher’s LSD post hoc test analysis on the influence of students’ religiosity on their academic achievement in Mathematics

<b>Religiosity</b>	<b>Low (n=205)</b>	<b>Average (n=175)</b>	<b>High (n=241)</b>
Low	15.26 <sup>a</sup>	3.06 <sup>b</sup>	2.33
Average	4.04 <sup>*c</sup>	18.32	5.39
High	3.33	7.37	20.65
Ms within 64.000			

a= Group mean along the principal diagonal

b= Mean differences above the principal diagonal

c= t-values below the principal diagonal.

The Post hoc multiple comparisons test result indicates the Fisher’s significant t-value of 4.04, 3.33 and 7.37. Students with average/low religiosity ( $t=-4.04$ ;  $p=.000$ ), students with low/high religiosity ( $t=3.33$ ;  $p=.000$ ) and students with average/high religiosity ( $t=7.37$ ;  $p=.000$ ) significantly differ in their academic achievement in Mathematics. This also implies that students with average religiosity with mean score of 18.32 performed better in Mathematics than their counterpart from low religiosity with mean score 15.26. Students with high religiosity with mean score of 20.65

performed better in Mathematics than their counterpart from low religiosity with mean score 15.26. Similarly, students with high religiosity with mean score of 20.65 performed better in Mathematics than their counterparts with average religiosity with mean score 18.32.

**Ho2:** There is no significant influence of students' gender on their academic achievement in Mathematics.

The independent variable in this hypothesis is gender while the dependent variable is students' academic achievement in Mathematics. To test this hypothesis, respondents were classified into two groups (Male and female). Based on the classification, their mean scores were compared using the independent t-test analysis and the result is presented in Table 3.

**Table 3:** Independent t-test analysis of influence of students' gender on their academic achievement in Mathematics

Variable	N	$\bar{x}$	SD	t-value	p-value
Male	271	19.62	4.82		
Female	350	17.36	4.15	6.152	.000
Total	621	18.34	4.26		

\*Significant at 0.05 level of significance

The result of the analysis ( $t=6.152$ ;  $p=0.000$ ) as presented in Table 3 indicated that there is a significant influence of students' gender on academic achievement in Mathematics. With this result, the null hypothesis was rejected at 0.05 level of significance and alternative hypothesis was accepted. The result also shows that the mean score of male students (19.62) is higher than their female counterpart (17.36). This implies that male students performed better than their female counterpart in Mathematics irrespective of their religiosity.

### Discussion of findings

The result from the first hypothesis revealed that students' religiosity significantly influences their academic achievement in Mathematics. The finding is in line with the finding of Ning and Murphy (2018) who examined the effects of religious affiliation and religiosity on students' performance; they found religiosity to have significantly influenced students' academic achievement in Mathematics. This finding also agrees with Jeynes (2010), who reported that students' religiosity increases academic achievement and lowers the achievement gap for under-represented students. The finding is in agreement with the finding of Derrico, Tharp and Schreiner (2015) who found religiosity as an essential quality for students' success and prolonged academic engagement. Similarly, this finding confirms the finding of Jeynes (2003) who, in a

large longitudinal survey study of over 18,000 students, found that religious students achieve at higher levels academically and outperform their less religious counterparts.

The result from the second hypothesis revealed that there is a significant influence of students' gender on their academic achievement in Mathematics. The finding agreed with Abdu-Raheem (2012) who investigated the influence of gender on secondary school students' academic performance in South-West, Nigeria, and reported that male students performed better than their female counterparts in Mathematics and Science subjects irrespective of their religion. The finding is also in line with the finding of Wordu and Iwok (2018) who examined the influence of gender and learning environment on students' academic achievement in Mathematics in Akwa Ibom State and found a significant influence of gender on students' academic achievement in senior secondary school Mathematics irrespective of their religious affiliation or commitment.

### **Conclusion**

Based on the findings of this study, it could be concluded that students' religiosity is very necessary and essential because it enhances academic achievement. Therefore, students' religiosity and their gender are very important factors and should be considered in the teaching/learning process to enhance students' academic performance in Mathematics in Secondary schools.

### **Recommendations**

On the basis of the findings of the study, the following recommendations were made:

- 1) Continuous students' religious practices should be encouraged to enhance their academic achievement in Mathematics.
- 2) Since religiosity enhances teaching and learning, it is therefore recommended that students' religious practices and commitment should be monitored and controlled by teachers and parents to curtail any negative influence on their academic achievement.
- 3) Since gender differences exist in Mathematics achievement, Mathematics teaching and evaluation strategies should be free of gender bias. This will make males and females to see themselves as equal, capable of competing and collaborating in school activities.

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