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EFFECT OF SOCIO-DEMOGRAPHIC VRIABLES ON ACADEMIC PERFORMANCE IN MATHEMATICS AMONG SECONDARY SCHOOL STUDENTS IN RIVERS EAST SENATORIAL DISTRICT

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Abstract
This study investigated the effect of socio-demographic variables on academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State. This study employed a descriptive survey design. The study population is composed of 8,024 senior secondary school students in Obio/Akpor LGA. The study used a sample of 198 students. The non-proportionate stratified random sampling method was adopted to draw students for the study. A self-structured questionnaire titled: Socio-Demographic Variables On Academic Performance in Mathematics Among Secondary School Students questionnaire (SDVAPMSSSQ). The instrument was validated by the researcher's supervisor and one other lecturer from the Department of Library and Information Science. The reliability of instrument was a t-test. Crubah Alpha was used with a reliability coefficient of 0.923. The instrument was analyzed using mean and standard deviation to answer the research question while t-test was utilized to test all the hypotheses at 0.05 level of significance. The findings of the study revealed that there was no significant influence of socio-demographic variables on academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State. Based on the findings, the study recommended that educators should continue to encourage students irrespective of age to take their studies seriously to maintain and improve their academic performance, and evaluation strategies should be free of gender bias. This will make males and females see themselves as equal, capable of competing and collaborating in school activities.

Keywords: Socio-Demographic Variables, Academic Performance, Mathematics.

Introduction

The education system and students' academic performance have a significant impact on the overall development of any society. It's important to ensure that students receive quality education and are equipped with the necessary skills and knowledge to become successful graduates. This, in turn, will contribute to achieving the Sustainable Development Goals, which are crucial for the progress of Nigeria. Academic performance has been identified as a key

factor in eradicating poverty and inequality and promoting economic development. This is according to the World Bank (2002), and it's also echoed in Nigeria's Vision 2030, which recognizes academic performance as a major component of the social pillar of the vision. On the other hand, poor academic performance among students not only affects them and their families but also has serious consequences for society as a whole, leading to a shortage of skilled workers across all areas of the economy and politics. (Aremu & Sokan, 2003).

Academic performance to Iwundu (2015) is the degree or level of success attained at the end of an academic endeavor. Other scholars conceived academic performance as the successful attainment of a goal, requiring a certain effort in a discipline or a subject or the degree of success attained in an academic pursuit or endeavor (Onyejiaku, 2017). In the context of this study, academic achievement can be seen as a yardstick for measuring one's level of academic prowess by assessing the academic performance of the individual through tests and systematic observation. A lot of psychosocial constructs are said to influence students' academic performance Mushtaq and Nawaz (2012) stated that academic performance is affected by social, psychological, economic, environmental, and personal factors, and that student's academic achievement could be either positive or negative, and it varies from one society to another.

Mathematics is a core and compulsory subject in the Senior Secondary School Curriculum which reflects the recognition of the vital role it plays in contemporary society (Federal Republic of Nigeria, 2014). The broad goals of secondary education as captured in the National Policy on Education is the preparation for higher education, and specifically, to equip the learner to live effectively in the modern age of science and technology. The knowledge of Mathematics is very necessary for the attainment of these goals.

Socio-demographic variables play a significant role in defining the characteristics of a person or a population. These variables include factors such as age, gender, ethnicity, socioeconomic measures, and group membership. Similarly, when it comes to students, their demographic factors are a combination of various attributes that set them apart and determine their behavior across different situations. These attributes may even help the individual accomplish tasks that are beneficial to him or society (Pestanaa et al., 2016).

Conversely, it was noticed from the reviewed studies that researchers have not done so much in determining the holistic influence of demographic variables (with four or more variables

involved) on academic performance in mathematics especially in Rivers State. Thus, there is a need to investigate the effect of demographic variables on academic performance in mathematics among Secondary Schools in Obio/Akpor LGA of Rivers State.

Aim and Objectives of the Study

The aim of the study is to investigate the effect of socio-demographic variables on academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State. Specially, the objectives of the study are:

1. To ascertain the effect of gender on academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State.
2. To investigate the effect of age on academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State.

Hypotheses

1. There is no significant relationship between gender and academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State.
2. There is no significant relationship between age and academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State.

Conceptual Clarification

Socio-Demographic Variables

Socio-demographic variables are an important tool for researchers, marketers, and policymakers to better understand the characteristics of different populations. These variables include factors like age, gender, income, education level, and geographic location, among others. By analyzing these variables, we can gain insights into the social and demographic makeup of different groups, as well as identify patterns and trends within society. Demographic factors refer to the various characteristics or traits that define a person or a group of people, such as their age, gender, ethnicity, socioeconomic status, and affiliations with certain groups. In the context of students, demographic factors can help differentiate between individual students and provide insight into their behavior and tendencies across different situations. (Awodun, Oni & Aladejana, 2014; Alhajraf & Alasfour, 2014).

Kaighobadi and Allen (2018) attempted to determine the academic success factors of students, focusing on factors potentially influencing their performance. They targeted gender, age,

ethnicity, and other demographic and academic variables. They found that students' performance is strongly correlated with demographics. The demographic factors;

Gender: According to Cambridge Dictionary Online (2015), "gender is the physical and/or social condition of being male or female." Abosede (2015) opines that gender is a range of characteristics distinguishing between male /masculinity and female/femininity, particularly in the cases of men and women. Several studies have been conducted to ascertain the influence of gender on student performance. Al-Khader (1996) observes that there is a significant correlation between the high school ratio and GPA. The study found that the GPA of female students was higher than male students. Rampacher and Peterson (1999) examined the effect of gender on students' performance in adjustive technique classes and found that no statistically significant differences exist between the adjustive performance of male and female students. Mondoh (2017) argues that males and females have unique cognitive styles that may influence the level of understanding and academic performance of students. However, Al-Tamimi and Al-Shayab (2015) investigated the factors affecting student performance in the Fundamentals of Financial Management and found that significant gender differences exist, with males outperforming females.

Age: One of the demographic factors that can likely influence student academic performance is age. The influence of age on academic performance has been investigated in several studies. According to Ebenuwa-Okoh (2010), "age of the individual student, as it increases, usually affects the various development changes. Rhodd et al., (2018) examine the factors that can affect the academic success of students at Florida Atlantic University and found that the age of students does not influence overall academic success. The study of Abdullah (2011) finds that younger students perform better than mature students. On the other hand, Grissom (2020) concluded that the negative relationship between age and achievement remains constant over time.

Marital Status: In terms of marital status several studies report better performance for married students compared to their unmarried classmates (Justin, Monique & Amal, n.d). Smith and Naylor (2021) the students graduating from all UK universities in 1993 and found that married students (men and women) do better than unmarried students. Similarly, Al-Mutairi (2010) observes that married students at the Arab Open University (AOU) outperform their unmarried counterparts, and concludes that marital status plays a significant role in determining students' performance.

Employment status: The escalating costs of schooling have made some students source funds for their education. Some students take out loans or qualify for grants or scholarships. Others, however, are left to pay their way using full-time or part-time employment (BYU, 2016). The MBA programme is designed in a way that students can run the programme on either full-time or part-time basis. The students examined in this study were admitted on a part-time basis which makes it imperative to ascertain the influence of working status on their overall performance. It was hypothesized that unemployed students are likely to perform better than the working class as they may likely have more time for studies all things being equal.

Academic Performance

Adeyemi (2018) viewed 'academic performance as the scholastic standing of a student at a given point.' Simply put, it is the academic ability of a student in a certain class or time. Concerning education research, the academic performance of a student can be regarded as the observable and measurable behaviour of a student in a particular situation (Yusuf, 2018). For instance, the academic performance of a student in Financial Accounting includes observable and measurable behaviour of the student at any point in time during a course; and this consists of his scores at any particular time obtained from a teacher-made test. As such, "academic performance of students consists of scores obtained from teacher-made tests, first-term examinations, mid-semester tests, and so on" (Yusuf, 2018). As a result, academic performance is a formative test or continuous assessment that measures what a child has learnt in the course of a programme.

On the other hand, Academic performance is defined as the aggregate of each student's demonstrated learning, knowledge, skills, and ability in the cognitive, affective, and psychomotor domains in school subjects as measured by student's grade in external examinations (standardized test) such as JSCE and WAEC or NECO SSCE (Kpolovie, Ololube & Ekwebelem, 2015). Here, Achievement addresses broad academic goals measured with standardized summative tests. For instance, "to qualify for recognition of undergraduate academic achievement, a student must have completed certain courses and should have attained certain grade-point average for the given semesters" (Yusuf, 2018). In other words, it is the continual observation of measurable behaviour of a person throughout a course that forms his academic achievement. To evaluate students' academic achievement, there should be an assessment of how well they accomplish the programme's goals; a summary of their cumulative academic programme performance up to the point of graduation.

Student Academic Performance in Mathematics

The inability of students to acquire this required knowledge in Mathematics is one of the major challenges in secondary education. This has resulted in students showing negative attitudes, loss of interest, and lack of attention in class during Mathematics. Only few students pass the subjects, even those who pass the subjects usually with low grades. Practically, all students believe that Mathematics is important for life, yet they demonstrate some negative attitude towards the subject (Pestanaa, Duarteb & Coutinhob, 2016). They perceive that the subjects are abstract, difficult, and uninteresting; thus are biased in the selections they make, and often do not consider the subjects/requirements needed for future careers, which leads to poor performance in both Mathematics. The ugly situation continues yearly as students no longer take the study of Mathematics seriously and they are not encouraged to do so. It is a source of worry to many stakeholders, especially parents, whose wards find themselves in this situation, and the government of Nigeria spends a large proportion of the nation's resources on education. One of the most significant factors responsible for students' poor academic performance is their demographic factors (Awodun, Oni & Aladejana, 2014).

Empirical Review

Ibok and Ntibi (2021) examined the influence of students' demographic factors on their academic achievements in Mathematics and Physics in Calabar Metropolis of Cross River State, Nigeria. Ex-post facto research design was adopted for the study. A sample of 1000 SS 1 students, out of 10,016 students, was selected from 24 secondary schools for the study using stratified and proportionate simple random sampling procedures. One instrument constructed by the researchers was used for data collection namely: Students Mathematics and Physics Achievement Test. One-way Analysis of Variance (ANOVA) and independent t-test were the statistical techniques adopted to test the hypotheses at 0.05 level of significance. The result of the analysis revealed that students' age does not significantly influence their academic achievement in Mathematics and Physics, and there was a significant difference between male and female students' academic achievement in Mathematics and Physics. Based on these findings, it was recommended, among others, that Mathematics and Physics teaching and evaluation strategies should be free from gender bias. This will make males and females to see themselves as equal, capable of competing and collaborating in school activities.

Ogunkuade and Kenku (2022) examined the socio-demographic determinants of academic achievement among secondary school students in the Federal Capital Territory, Abuja, Nigeria.

The study is premised on the foundation of Vision 2030 and its priority for education as a major component of the social pillar of the world economy. This is also, coupled with its highlight of socio-demographic factors as a major component of academic achievement among adolescents who made up the secondary school population. Descriptive design method was employed for the study, with a sample of 150 participants, which comprised 74 (49.3%) male and 76 (50.7%) female students who were selected through a simple random sampling technique. Qualitative and quantitative data were collected through a structured questionnaire developed by the Researchers, and Parent Authority Questionnaire (PAQ) developed by Buri (1991) respectively. Three hypotheses were tested using t-test for independence and multiple regression analysis at 0.05 level of significance. Results demonstrated significant parenting styles difference on academic achievement [t (148) = 3.89; P<05] Additionally, results revealed a significant gender difference on academic achievement [t (148) = 3.21; P<05] Lastly, findings show a significant joint prediction of demographic variables on academic achievement {R= .26; R2= .06 F (3, 146) = 3.47; P<05} The study concluded that parenting styles and demographic factors have impact on academic achievement among adolescent students in Nigeria. It is recommended that the Ministry of Education should organize guidance and counselling programmes in the communities to sensitize and educate parents on various parenting issues.

Tafamel and Adekunle (2016) determined the influence of demographic variables such as gender, age, marital status and employment status on students' academic performance in the Masters of Business Administration (MBA) programme of the University of Benin, Nigeria. Ex-post facto research design was adopted by examining the records of one hundred and eighteen (118) students that were able to pass the required courses within the specified period of time for the programme. Secondary source of data was used by extracting the needed information from the students' record forms and final results spreadsheet. Data were analysed using frequency distribution, percentages, mean, T-Test and analysis of variance. The study reveals that male students perform better than female students; single outperform married students; not employed students perform better than the employed students while younger students outperform their older counterparts. It was also found that there is no statistically significant relationship between demographic variables and student academic performance. It is recommended that demographic attributes of students/candidates should not be considered as a critical factor in admitting students into the MBA programme.

Methodology

This study employed a descriptive survey design. Descriptive survey is a type of descriptive survey that not only explains some characteristics of the sample as they exist at the time of study but, goes further to compare the various strata of the sample through the use of hypothesis (Nwankwo, 2016). The study adopted descriptive survey research design because it promotes the collection of data from a large sample with several characteristics and allows the comparison of population characteristics (demographics) concerning students' academic performance in mathematics. Therefore, the design is appropriate for the study.

The study population is composed of 8,024 senior secondary school students in Obio/Akpor LGA (Source: Post Primary Schools Board, Obio/Akpor Zonal Office). The study used a sample of 198 students. The non-proportionate stratified random sampling method and simple random sampling were adopted to draw students for the study. First, stratified sampling technique was employed to select students from different locations (100 students each from urban and rural areas) and school ownership composed of 100 private and 100 public students (two private and two public schools). After, stratification of the sample, the simple random sampling technique was used to draw a total of 200 students for the study, out of which 198 instruments were retrieved while three were lost. A self-structured questionnaire titled: Socio-Demographic Variables On Academic Performance in Mathematics Among Secondary School Students questionnaire (SDVAPMSSSQ). The instrument was validated by the researcher's supervisor and one other lecturer from the Department of Library and Information Science. The reliability of instrument was a t-test. Crubah Alpha was used with a reliability coefficient of 0.923. The instrument was analyzed using mean and standard deviation to answer the research question while, t-test was utilized to test all the hypotheses at 0.05 level of significance. Data analysis was carried out using SPSS version 23.

Results

The Results show the Demographic Distribution.

Table 1: shows the demographic response

Ages	Frequency	Percentage (%)
12-15 yrs	139	70.2
16yrs & Above	59	29.8
Total	**198**	**100**

Gender	Frequency	Percentage (%)
Male	95	48
Female	103	52
Total	**198**	**100**

Table 1 above shows the demographic distribution of the respondents. The age of the participants was between 12 to above 16yrs. The demographical data showed that 139(70%) fell within ages 12-15 years while, 59(30%) fell between 16yrs and Above. The data showed that distribution was composed of younger students. For gender of the students, the data showed that 95 (48%) were male and 103 (52%) were females, this reveals that more females participated in the study.

Hypotheses 1: There is no significant relationship between gender and academic performance in mathematics among secondary school students in Rivers East Senatorial District of Rivers State.

Table 2: Shows the relationship between gender and academic performance in mathematics among secondary school students.

Gender	N	Mean	Std. Deviation	DF	Alpha	T	Sig.(P)	Decision
Male	95	20.60	12.068	196	0.005	.022	.982	Not significant, P>0.05
Female	103	20.56	11.517					

Results from the Table 2 indicates that calculated t-value at df (196) is 0.022 with a P value (0.982) greater than the chosen alpha; thus, the null hypothesis was not rejected. This implies that gender has no significant influence on academic performance student in mathematics.

Table 3: Shows the relationship between Age and academic performance in mathematics among secondary school students.

Gender	N	Mean	Std. Deviation	DF	Alpha	T	Sig.(P)	Decision
12-15yrs	139	20.09	11.381	196	0.05	-895	.375	**Not significant**, P>0.05
16and above	59	21.73	12.617					

Results from Table 3 indicates that calculated t-value at df (196) is 0.89, with a P value (0.372) less than the chosen alpha; thus, the null hypothesis was not rejected. This means that Age has no significant influence on academic performance student in mathematics.

Discussion

The first result shows that gender does not significantly influence academic performance of student in mathematics. The result of this work is not surprising because of increased enrolment of females in schools and the promotion of female education. This was also shown in the study, which reported 52% of female students. This implies that male and female students have equal academic ability to perform well in an ideal classroom situation. The result is similar to the work of Fyneface and Chikwe (2016); Njigwum and Longjohn (2019) but, dissimilar to the work of Sam (2016). However, on the issue of gender, researchers still share different views on its influence to academic performance. Though, the result of the study upheld that gender of students has no significant influence on their academic performance in mathematics.

The second finding disclosed that age does not exert any significant influence on academic performance of student in mathematics. The result was surprising as it expected lower performance from older students who either had delayed enrolment to school or who had been out of school for some years before returning. It was observed that most of this older students are either 'helps' to their guardians or they are involved in some part time job to support themselves while schooling. Nonetheless, the finding highlights that chronological increase in years has no tangible influence on students' academic performance in mathematics. Thus, affirming the fact that age without informed experience is just a number tag. Although, because of the dearth of studies in this area, no study was cited to affirm the result, hence, the gap for the work.

Conclusion

Based on the findings of this study, it could be concluded that students' demographic variables are very necessary and essential in teaching and learning, especially in Mathematics. Therefore, gender and age are very important variables and should be considered in teaching and learning Mathematics to enhance students' academic performance in schools.

Recommendations

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

1. Educators should continue to encourage students irrespective of age to take their studies seriously to maintain and improve their academic performance.
2. Evaluation strategies should be free of gender bias. This will make males and females see themselves as equal, capable of competing and collaborating in school activities

References

Abdullah, A. M. (2011). Factors affecting business students' performance in Arab Open University: The case of Kuwait. *International Journal of Business and Management,* 6(5), 146-155.

Abosede, S. C. (2015). Gender, parents' job type, and family size as determinants of junior secondary school students' academic performance. *International Journal of Humanities and Social Science,* 5(4), 75-81.

Adeyemi, T. O. (2018). Predicting students' performance in senior secondary certificate examinations from performance in junior secondary certificate examinations in Ondo State, Nigeria. *Middle-East Journal of Scientific Research,* 3(2), 73-81. http://www.idosi.org/mejsr/mejsr3(2)/6.pdf.

Alhajraf, N. A., & Alasfour, M. A. (2014). The Impact of demographic and academic characteristics on academic performance. *International Business Research*, 7(4), 92-100.

Al-Khader, O. (1996). Factors affecting the academic performance of psychology students at Kuwait University. *The Educational Journal,* 10(40), 141-169.

Al-Mutairi, A. (2010). Factors affecting business students' performance in Arab Open University: The case of Kuwait. *International Journal of Business Management,* 6(5), 146-155.

Al-Tamimi, H., & Al-Shayeb, A. (2015). Factors affecting student performance in the introductory finance course. *Journal of Economic and Administrative Sciences*, 18(2), 76-86.

Aremu, O. A., & Sokan, B. O. (2003). A multi-causal evaluation of academic performance of Nigerian learners: issues and implications for national development. Department of Guidance and Counselling, University of Ibadan, *Journal of Educational Studies,* 3(1),

20-30.

Awodun, A. O., Oni, S. A., & Aladejana, A. L. (2014). Students' variables as predictors of secondary school students' performance in physics. *International Journal of Scientific and Research Publications,* 4(8), 1-5.

BYU Employment Services. (2016). Effects of employment on student academic success. www.byu.edu/hr/sites/default/files/effects_of_student_employment.pdf

Ebenuwa-Okoh, E. E. (2010). Influence of age, financial status, and gender on academic performance among undergraduates. *Journal of Psychology,* 1(2), 99-103.

Federal Republic of Nigeria (2014). *National Policy on Education* (revised Edition). NERDC Press.

Fyneface, G., & Chikwe, K. C. (2018). Comparative study of gender differences in the academic achievement of students selected private and public secondary schools in Rivers State. *International Journal of Psychology and Counselling, 9*-16 (1), 15-30.

Grissom, J. B. (2020). Reclassification of English learners. *Education Policy Analysis Archives,* 12(36), 1-38. http://epaa.asu.edu/epaa/v12n36/.

Ibok, E. E., & Ntib J. E. E. (2021). Students' demographic factors on their academic achievements in Mathematics and Physics in Calabar Metropolis of Cross River State. *Prestige Journal of Counselling Psychology,* 4(1), 121-130.

Iwundu, C. O. (1995). *Psychology for the education and health professions*. Capicc Publishers Nig Ltd.

Justin, T., Monique, R., & Amal, A (n.d). Marital status and gender as predictors of undergraduate academic performance: A United Arab Emirates context. Zayed University, UAE.

Kaighobadi, M., & Allen, M. (2018). Investigating academic success factors for undergraduate business students. *Decision Sciences Journal of Innovative Education,* 6(2), 427–436.

Kpolovie, P. J., Ololube, N. P., & Ekwebelem, A. B. I. (2015). Appraising the performance of secondary school students on the WAEC and NECO SSCE from 2004 to 2006.

International Journal of Scientific Research in Education (IJSRE), 4(2), 105-114.

Mondoh, H. O. (2017). A comparison of activities carried out by boys and girls during their free time in relation to their achievement in mathematics. A case of Eldoret municipality, Kenya. *Journal of Education and Human Resources,* 1, 49-56.

Njigwum, A. S., & Longjohn, I. T. (2019). Junior secondary certificate basic science performance as predictor of senior school certificate examination (SSCE) biology performance in public secondary schools in Port Harcourt Metropolis. *African Journal of Behavioural and Scale Development Research (AJB-SDR), 1*(1), 101-107.

Onyejiaku, F. D. (1987). *Techniques of effectives study*. Wusen Press Ltd.

Pestanaa, L., Duarteb, J., & Coutinhob, E. (2016). Socio-demographic variables determine the academic performance of Adolescents. *The European Proceedings of Social & Behavioural Science (EPSBS),* 2, 203-208.

Rampacher, A., & Peterson, C. (1999). Effects of gender and age on adjustive technique class performance. *The Journal of Chiropractic Education,* 13(2), 114-130.

Rhodd, R., Schrouder, S., & Allen, M. (2018). Does the performance on principles of economics courses affect the overall academic success of undergraduate business majors? *International Review of Economics Education*. http://www.economicsnetwork.ac.uk/iree/v8n1/rhodd.pdf.

Sam, L. (2016). Gender difference in academic performance of financial accounting students in selected senior high schools in the central region of Ghana. *Advances in Social Sciences Research Journal*, 3(8) 40-46.

Smith, J., & Naylor, R. (2021). Determinants of degree performance in UK universities: a statistical analysis of the 1993 cohort. *Oxford Bulletin of Economics and Statistics,* 63(1), 29-60.

Tafamel, A. E., & Adekunle S, A. (2016). Demographic variables and students' academic performance in masters of business administration (MBA) programme. *Lapai journal of management sciences* 6(4), 458-465.

World Bank (2002). *Globalization, growth and poverty: Building an inclusive World Economy.*

A World Bank Policy Research Report. World Bank and Oxford University Press.

Yusuf, A. (2018). Inter-relationship among academic performance, academic achievement and learning outcomes. https://musero.org.ng/publications/interrelationship_among_academic_performance_academic_achievement_learning_outcomes. Pdf.