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INFLUENCE OF FAMILY BACKGROUND VARIABLES ON THE ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL PHYSICS STUDENTS'

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Abstract: The physics students' poor learning outcomes and achievement has warranted this study. The study therefore, examined the influence of family background on the academic performance of Secondary school Physics students in Enugu North Local Government Area of Enugu State, Nigeria. The study was anchored on Bowen theory of Human Behavior. The study adopted a correlational survey research design. Three null hypotheses guided the study. The study targeted students, teachers, and parents. The population of the study was 1670 SSS 2 physics students in Enugu North L. G. A. of Enugu state. The sample size of the study was 180 SS 2 Physics students. The Simple random sampling technique was used to select the students' participants of the study. The study used questionnaire titled Family Background Scale (FBS) to collect data. Data were analyzed using path analysis to test the proposed hypotheses. The findings of the study revealed that parental socio-economic status contributed 37% prediction to physics students' academic achievement. Also, that parental educational background impacted 35% prediction of physics students' academic achievement. Based on the findings, it was recommended that the school management and teachers should help to sensitize the parents on the importance of the family on the students' holistic formation especially their academic achievement.

Keywords: Science, Physics, Achievement and Family background

Introduction

Science brings about systematic and logical approach to discovering how things in the universe work. Science is also the body of knowledge accumulated through the discoveries about all the things in the universe. Such may include things like the discovery of things and their effects in nature, knowledge of human actions on things, events and the consequence of such action and understanding derived from control of diverse phenomena in nature (Alina, 2017). According to Lyndsay Max (2021), Science is defined as the observation, identification, experimental investigation and theoretical explanation of natural phenomena; Science is also a system of acquiring knowledge based on the scientific process or method in other to organize a body of knowledge gained through research.

There are many branches of science as Computer Science, Ecology, Meteorology, Paleontology, Chemistry, Physics, Biology, Mathematics,

Geography, Micro biology, Meta physics, Physiology, Botany, Anthropology, Psychology, Earth science, Astrology, Natural Science, Biochemistry and Genetic (Wikipedia, 2023). Science is studied at all level of education, nursery, and primary to secondary and tertiary level. Science is taught as basic science in junior secondary school and taught as chemistry, physics and biology in senior secondary school. Physics is defined as a branch of science that deals with the study of matter and its relationship with energy. Physics is the study of systematized knowledge produced by observation, measurement and experiment which attempts to establish general laws or principles to describe the phenomena under study (Ogan & Francis, 2017a). Physics as described by Okoronka and Wada (2014) is a methodical study of nature based on observation, reason and mathematical analysis. Physics helps to understand the fundamental building block of the universe and how nature interacts to produce energy (Onah, 2024). Physics deals with fundamental elements such as matter, energy, motion and force. Ogan and Francis (2017b) defined Physics as a science that involves the study of the physical properties of matter and its interaction with energy.

Physics generates the fundamental knowledge needed for the future technological advances that will continue to drive the economic engine of the world. Physics contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries. As a branch of natural science physics occupies an important place in secondary school curriculum. As an academic discipline, physics is highly admirable as it even creates a sense of excitement among learners. Its inclusion in the curricular of secondary schools and technical colleges has been justified by the educated citizenry. Physics has contributed extensively to the areas of engineering and technology use the inventiveness and knowledge of physics (and other science) to provide solution to difficulties that can lead to the development of a nation. Consider the following examples; Electrical generators used in power stations are the harvest of discoveries made by Faraday (Duncan 2016). So too are electric motors, the heart of so many of today's appliances, including Robots which are becoming increasingly important in manufacturing industry. Radio and television were developed from the theoretical ideas of Clerk Maxwell pertaining to the relationship between electricity, Magnetism and light. Subsequently the effort of Hertz, Marconi, Logie - Baired and others made possible the transmission of signal over a distance (Duncan 2016). Prediction about the paths taken by artificial satellite and space vehicle are based on the fundamental laws put forth by the English genius, Sir Isaac Newton in the late 17th century. They have contributed to the "Conquest of space with its many beneficial spin off. Physics trigger industry: In 1954, physicist Charles Townes developed the maser, the forerunner to the laser. This discovery which was not seen by many to have any practical use has simulated the industry today in so many ways. Only a few areas of science have caught the population imagination more than the laser. There are many uses to which laser are nowadays applied, some examples follow; Carbon dioxide laser used in some type of surgery (Duncan 2016). Lasers are used to correct vision, remove tumor and coronary blood clot and close wounds AIP (American institute of Physics 2017). Laser surgery is faster than scalpel, can be non - invasive and seals blood vessels, making some transfusion unnecessary. For instance, laser eye surgery takes minutes and require no hospital stay. Blindness in diabetic in advanced countries decreased by 60% because of laser surgery. Physics create good Job Opportunities:

Research in plasma physics, semiconductor processing and magnetic material, helped to build one of the largest industries in the world and the government continue to maintain an active leadership role today. The electronic and semiconductor industries account for around 65% of the Gross domestic product representing 400 billion Dollar and 2.6 million jobs opportunities in the world. Today, computer and microprocessor are found everywhere from desktop to our cars, cellular phone, Television and traffic light, influencing our daily lives in ways too numerous to count.

Despite the great importance and objectives of studying physics, students' achievement in the subject has not been encouraging. This is evident in the West African Examination Council (WAEC) Chief Examiner's report in May/June (2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020 and 2021) reveals poor academic achievement of students in physics. For example, the failure rate of 18.27%, 11.76%, 9.20%, 22.92%, 12.27%, 13.47%, 15.25%, 14.52%, 9.8%, 8.23%, 10.1% and 7.2% were recorded in 2010, 2011,2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020 and 2021 respectively in physics and this failure was recorded more in mechanics. It is disappointing to note that the students' achievement has remained considerably poor despite the relative importance of physics. Students' persistence poor performance has been ascribed to inadequate teaching methods adopted by science teachers, the influence of family to Education System which can be positive or negative, the peer and society pressure all these contribute to the Poor academic performance in physics by physics students in a particular Education zone.

Academic performance is the extent to which a learner, teacher or institution has attained their short- or long-term educational goals. According to Linus Tambo (2015), academic performance involves factors such as the intellectual level, personality, motivation, skills, interests, study habits, self-esteem or the teacher student relationship. These factors can be fully achieved in the pupils' life when there is cooperation between the positive life in families and in school.

The family is an institution as well as an agent of socialization responsible for determining the pupil's attitude towards intellectual, religious, character and moral upbringing. According to Aliyu Gambiri (2016), the family lays the fundamentals of moral and religious upbringing of the child, and in a way dictates how he relates with others regarding the idea of right and wrong, good and bad. Therefore, its influence on the child, specifically, parental socio-economic and educational background cannot be over emphasized. The family is of great importance and very significant to the development of a child since the background of a family can affect a child either positively or negatively (Agunna 2019).

Family background is the institution of man and woman that raises the child into a complex world. Mpiluka (2014) expressed that family background has been of great significance in ascertaining the academic performance of a child in schools all over the world. This is because academic performance often times is motivated by the type of people the child interacts with in their early stages in life from their homes. According to Coukline (2017), family background is all the conditions and circumstances in the family which influence the child's physical, Intellectual, and emotional wellbeing. Family background is a collective terminology comprising of social class/status, economic status, family size, family structure, parents 'educational level, occupation and other factors pertaining to family life. Family background in the context of this study refers to family structure, parents 'occupation and parents 'level of education. Family background also

refers to all the conditions and circumstances in the family which influence the child physically, intellectually and emotionally well-being (coukline, 2017). Students coming from different family backgrounds are affected differently by such family condition, which is why some children have good family background while some have poor background. Formal education therefore remains the vehicle for human development which must start from the family. According to Okpalla (2017) students from educated family background have edge over those from uneducated family background. In his view, these students from educated home will always pay attention in the class as the parents will always ask them about their school results. In the case of uneducated home, no such reference is made. The family setting and its socializing influence mold the personality of the child. Nigeria, for instance is a society with diverse ethnic groups with various cultural background in areas like family structure, family size, occupation and in extreme cases, religion (Bakar, Ibrahim, & Mudassir, 2017). By family structure is meant whether the family is monogamous or polygamous.

Family sizes have been linked with high academic achievements (Majoribank, 2015). Majoribank further stressed that students with fewer siblings are likely to receive more parental attention and have support that lead to better school performance, family (small or large size) remains the primary environment of every child. The family begins the process of education and provides physical and psychological needs of the child. This support the view of Meduewisi (2016), that the environmental experience from family, peer group and school location have great influence in determining child's intellectual ability. She maintained that bright children from less privileged family environment may turn dull due to impoverished family environment. She added that mental development influence intellectual development. This is in line with Hebb (2014) who observed that the innate potential of children cannot be attained without adequate stimulating family environment because the child cannot do well intellectual. The implication is that a proper stimulating family environment with intellectual potential and appropriate teaching methods will definitely enhance maximum performance of the child in school.

Statement of the Problem

Students' poor academic achievement and learning outcome in physics constitutes a great source of worry and serious concern to parents, school managers, and educational policy makers. It has been observed that some parents encourage their wards academically, while others do not. This is arguably as a result of their educational background and socio-economic status. Some parents motivate their wards academically by promptly paying their school fees, providing them with educational materials, and helping them with their assignments, while some do not. In this context, one wonders the role family background plays on the academic performance and achievement of these physics students. It is against this backdrop therefore, that this study set out to investigate the influence of family background on academic performance of Physics in Enugu North Local Government Area

Purpose of the study

The purpose of the study is to determine the influence of family background on academic performance of Physics students in secondary school in Enugu North Local Government Area. Specifically, this study sought to determine the:

1. Influence of parental Educational background on academic achievement of Secondary school students in physics.

2. Influence of parental socio-economic status on academic achievement of secondary school students in physics.
3. Influence of family structure on academic achievement of secondary school Physics students in physics.

Hypotheses

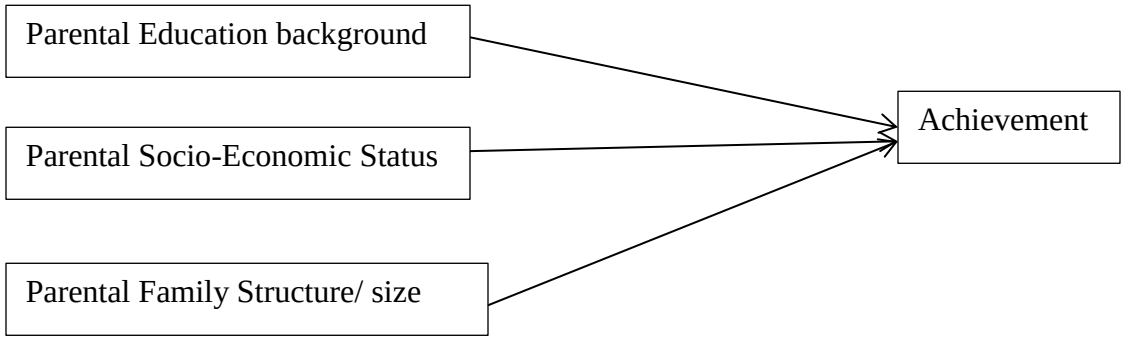
The following null hypotheses were proposed for the study, which was tested at .05 level of significance.

HO_1: Parental socio-economic status has no significant influence on academic achievement of physics students.

HO_2: Parental educational background has no significant influence on academic achievement of physics students.

HO_3: Parental family structure has no significant influence on academic achievement of physics students.

Conceptual Model



The conceptual framework above shows the respective influence of the independent variables on the dependent variable (Physics achievement). The connecting arrows indicated that parental educational background can change the achievement of physics students when incorporated into teaching and learning of physics. Likewise other variables like parental socio-economic status and family structure. The study was anchored on Bowen theory of Human Behavior (1966). According to Bowen's view of human behavior, humans are products of evolution, and the same natural forces that control other living things also strongly influence human conduct. Every multigenerational family, when viewed over several generations, has high functioning individuals, various black sheep, people from all socioeconomic levels, people with stable marriages, people who divorce, people with schizophrenia and alcoholism, people who commit serious crimes, people who die young from a variety of causes, and people who make unusual contributions to society. Regardless of socioeconomic background, color, or culture, families are inherently prone to this kind of variation. This theory is highly connected to the study as it reveals the importance of family background levels as shown in the study.

Method

The study adopted a correlation research design. The correlational survey design was preferred because it is the kind of study that seeks to establish what relationship exist between two or more variables and as well predict the relevance of one over another (Nworgu, 2018). The correlation subtype is to clarify an understanding of important variables that have already occurred through the identification of relationships among the variables. The study was

carried out in Enugu North Local Government Area of Enugu State, Nigeria. Enugu State has seventeen local government areas which include: Enugu, Aninri, Awgu, Enugu East, Enugu North, Enugu South, Ezeagu, Igbo Etiti, Igboeze North, Igboeze South, Isiuzo, Nkanu East, Nkanu West, Nsukka, Oji River, Udenu, Udi and Uzo-Uwani. Enugu North local government area is located at the central and capital of Enugu state, where all the government agencies and parastatals are located. The area houses many indigenous tertiary institutions which include University of Nigeria, Enugu Campus, Institute of Management and Technology, College of Education Technical and many private institutions. The area is predominantly urban in nature with basic amenities such as good roads, hospitals, electricity, schools and markets. Most people living in the zone were civil servants, students, traders and few farmers. The researcher chose Enugu North local government area due to the fact that most of the secondary schools have qualified physics and affluent teachers, laboratories and instructional materials and yet students experience difficulties in answering questions in physics in their external examinations which was evident in their final achievement scores and grades in WAEC results hence the need for the study in the area. Therefore, this research will help teachers to integrate academic family related variables and academic motivation which will in turn enhance good academic achievement. The population for the study was 894 SS2 Physics students from 9 public secondary schools in Enugu North Local government area. One hundred and eighty (180) SS2 physics students (93 males & 87 females) drawn through 20% of the population formed the sample of the study. The nine public secondary schools in the area were all sampled. 20% of the SS 2 population was drawn from each school, while a simple random sampling approach was used to select the participants. The schools were chosen based on the existence of well-equipped physics laboratories and experienced physics teachers with teaching qualifications.

The instruments used for data collection was the family background scale adapted from Brese and Mirazchiyski (2021) modified by the researchers and students' achievement scores retrieved from their school records through their form teachers were used for data collection. Originally, the family background scales were for general family background scale putting together all levels of family involvement "My parents provided many books for me at home", it was also rated on 5 point likert. These were modified to specifically physics family background scales. The instrument FBS was categorized into family socio-economic, family educational background and family structure. Each containing 25 items and each item is scored on 4 – point likert-type scale: (Strongly Agree 4: Strongly Disagree 1 for positive construct and reverse for negative construct). The instrument Family Background Scale (FBS) was face validated by three experts and tested for internal consistency reliability using Cronbach's Alpha which yielded a coefficient of 0.78, 0.83 and 0.92 indices for family socio-economic, family background and family structures respectively. Physics academic Achievement scores were extracted from the students' promotional examination of 2023/2024 academic session. This is because the Enugu state government conducted a unified examination across the state secondary schools for promotion course. The variable of academic achievement is an interval scale. A student's achievement score is lower or higher than another. The instrument was distributed to the respondents upon selection through the help of the research assistants who doubled to be their physics teachers in their respective schools. This method

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enabled the researchers to have 100% return of the filled instruments. The proposed hypotheses, a path analysis in AMOS version 22 was employed, and all estimates were calculated using the maximum likelihood at 95% bias-corrected confidence intervals (CI95%).

Results

This result also showed in path diagram and its goodness of fit measured with CMIN (30.994), DF (3), GFI (.964), AGFI (.822), CMIN/DF (10.331), CFI (.786), TLI (.571), IFI (.790), SRMR (.464), RMSEA (.228) and Pclose (0.000). All these fit indices of model showed perfect for good model.

Hypothesis 1: Parental socio-economic status has no significant influence on academic achievement of physics students.

Table 1: Summary of regression weights of the observed variables

Relationships			Estimate	S.E.	C.R.	P-Value	Decision
Achievement	<---	Socio-economic	.365	.051	7.183	***	Significant
Achievement	<---	Education background	.349	.062	5.668	***	Significant
Achievement	<---	Family size	.162	.040	4.067	***	Significant

Table 1 shows that the probability of getting a critical ratio as large as 7.183 in absolute value is less than 0.000. The result figured out that family socio-economic status influences academic achievement (β= .365, t (180) = 7.183, P < 0.05[.000]). In other words, the null hypothesis is rejected. Thus: the regression weight for **family socio-economic status** in the prediction of **Academic achievement** is significantly different from zero at the .000 level (two-tailed). This shows that 37% variation in physics students' achievement scores was accounted for their parental socio-economic status. On the other hand, 63% variation in their achievement scores was accounted for other variables other than family socio-economic status.

Hypothesis 2: Parental Educational background has no significant influence on academic achievement of physics students.

Table 1 shows that the probability of getting a critical ratio as large as 5.668 in absolute value is less than 0.000. The result figured out that family educational background influences academic achievement (β= .349, t (180) = 5.668, P < 0.05[.000]). In other words, the null hypothesis is rejected. Thus: the regression weight for **family educational background** in the prediction of **Academic achievement** is significantly different from zero at the .000 level (two-tailed). This shows that 35% variation in physics students' achievement scores was accounted for their parental socio-economic status. On the other hand, 65% variation in their achievement scores was accounted for other variables other than family educational background.

Hypothesis 3: Parental family structures/size has no significant influence on academic achievement of physics students.

Table 1 shows that the probability of getting a critical ratio as large as 4.067 in absolute value is less than 0.000. The result figured out that family structures/ size influences academic achievement (β= .162, t (180) = 4.067, P < 0.05[.000]). In other words, the null hypothesis is rejected. Thus: the regression weight for **family structures/ size** in the prediction of **Academic achievement** is significantly different from zero at the .000 level (two-tailed). This shows that 16% variation in physics students'

achievement scores was accounted for their parental socio-economic status. On the other hand, 84% variation in their achievement scores was accounted for other variables other than family structures/size.

Discussion

The result of data analysis confirmed that parental educational background have significant influence on the Secondary school student's achievement in physics. The Researcher observed from the result that parents who are educated always provide most of the recommended textbooks and other learning materials for their children. Educated parent always want their children to be educated, parents who are educated encourage their children to study Subject which are pivotal for good University course. This findings is in agreement with the Findings of Bakar, Ibrahim, and Mudassir (2017), they opined that students whose parents have a higher level of education do much better in Science, Reading and Arithmetic Tests than those whose parents had no or little Basic learning. Also, Okpalla (2017) expressed that educational level of parent which is an indicator of Socio-economic status has direct influence on child's value and Academic performance in school.

Again, the result of data analysis agreed that Parental socio-economic status have significant influence on Secondary school student's performance in physics. The Findings of this question two are in conformity with Bakar, Ibrahim, and Mudassir (2017 who opines that the lower income families may be aware of the importance of education in the society, but at the same time they are also aware of their limited resources to measure up with such educational demand. According to these authors, a family that can scarcely provide the basic needs of the family which include food, shelter and clothing will hardly motivate the academic excellence of their children, instead, they will pressurize their children to seek for job opportunities with the little education they acquired to support the family. The Researcher observed from the result that Socio economic status of a family mainly is capable of affecting the families with high Socio-economic status often have more Success in preparing their children for school because they typically have access to wide range of providing their young children with high quality childcare and book.

Furthermore, the result of data analysis agreed that family structure has a significant influence on Secondary school student's performance in physics. The Researcher observed that for a family to be united and form a well family structure, it takes Responsibility, Diligence and Respect, Love and Understanding among members of the Family to have well family structure which will boost and motivate the children to perform well in school subjects and other school related activities. The Findings is also in agreement with the findings of Agunna (2019), who said that Life in a single parent family can be stressful for both the children and the parent and such families are faced with challenge of diminished financial resources. Also, in single parent families, children may suffer some psychological and social problem which affects their academic performance in school.

Conclusion and Recommendation

The study concludes that family background factors are very crucial and have significant influence on students' academic performance in Enugu North Local Government Area of Delta State, Nigeria. For instance, it was made evident that parents with high educational background, and those with high socio-economic status motivate their children to study hard than those of their counterparts. This suggests that to a very high extent, family background plays a pivotal role in pupils' academic achievement in school. In line with the findings of the study, it was suggested that school management and teachers should help to

sensitize parents on the importance of the family on the pupils' holistic formation. Students who are not privileged to come from parents with high educational background or high socio-economic status should not live in despair, but work hard in school in order to perform academically. All parents should endeavour to take the academic life of their children seriously by providing them all the necessary educational resources for their holistic formation in school.

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