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Factors that Influence Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University, Zaria

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Abstract

This study investigated the factors that influence students' choice of physics and academic achievement among undergraduate students of Ahmadu Bello University Zaria. The research design for the study was a descriptive survey design. The population of the study was the entire physics education students (100-400 Level) of Ahmadu Bello University Zaria during the 2011/2012 Academic Session. The total number of the students was 167 involving One Hundred and Nineteen (119) Male students and Fourty Eight (48) Female students. The entire population of the students was used for the study which gives an equal opportunity for all the students to be selected. A two section (A & B) structured questionnaire comprising of 15 items was constructed by the researcher to gather the required data. The instrument had undergone both validity and reliability test. The validity test was done by two (2) science education experts in Institute of education, Ahmadu Bello University Zaria and the corrections made were implemented. The reliability coefficient obtained was 0.75 through a test re-test method. Research questions raised were answered using the analysed data from frequency tables, simple percentages, bar chart and pie charts. The research findings revealed that both family background and gender have influence on students' choice of physics and academic achievement. It is

recommended among others that science education department lecturers should frequently organise science symposiums in order to attract the interest of more students towards science based courses like physics.

***Keywrds**: Influence, Choice, Academic Achievement, Physics, Student*

Introduction

One of the overriding United Nations (UN) Millennium Development Goals (MDG) is the elimination of illiteracy among the residence of developing countries as education is vital to development. Education is increasingly gaining prominence as one of the most important subject in Africa in an effort to escape illiteracy and poverty (United Nations Education Scientific and Cultural Organization [UNESCO], 2004). Many countries of the world, African countries included have invested substantial amount of money in their budget to enhance attainment of education to the citizens (Kyalo et al., 2006).

Mbithe (2012) noted that if we outfit our students with skills such as critical thinking, creativity and courage they will be ready for a better life in a globally connected world. One way of doing this is through the teaching of physics in schools. Physics attempt to understand the underlying laws governing our universe. By understanding those laws, we can better interact with and harness our environment.

To gain perspective into how much physics has contributed to our livelihoods, Pravica (2005) considers the following as miracles from Physicists; Alternating Current, Hydroelectric Power, Electric Motors, Radio, Microwave, Ovens, Satellites, Radar, Modern Rocketry, Nuclear Magnetic Resonance, Magnetic Resonance Imaging (MRI), X-rays, Lasers, Transistors, Light Emitting Diodes, Oscilloscopes, Television, Holography and the World Web among many others. There is a deep relationship between discovery in physics and new technology. We all benefit from the priceless contributions of physics. Contributions from physics generate many trillions of dollars for the world economy and aid our existence immeasurably.

The choice of physics as a major field of study or taking higher physics

course is shaped by physics self-concept, students interest, motivation, prior achievement, physics self-efficacy, pre-college preparations and teachers in-service training on how to implement innovative physics curriculum (Lawrenz et al., 2009; Shibeshi et al., 2009).

Accordingly, in a study that attempted to find variables that affect physics achievement, Lawrenz et al. (2009) found out that students who underwent "active physics'' scored higher for the greater part of the year compared to those who did not undergo the same experience. While at the same time, the study claims that the achievement gap between boys and girls narrowed for those groups who took ''active physics''.

Gender difference in interest emerge when other factors come into play which can compromise self-concept of performance in physics. Hoffmann (2002) stressed that gender difference in interest seems to be sufficiently explained by gender differences in self-concept.

Lyons (2004) in his research in Australia on choosing physical science as reported by Kimeli and Ruth (2017) noted that students would chose physical science due to parents positive comments, positive behaviour and personal histories about the science. Lyons (2004) found out that some students saw the high status of their parent credentials or occupation as representing what could be achieved through University study. When parents held positive discussions of science related issues, helping students with science projects and homework, sharing views of science, TV documentaries helped such students to choose science subjects even at higher levels. He further noted that parental use of science language encouragement and good parental child relationship also motivates students. Parents occupations such as medicine, engineering science teaching etc., and parents' financial stability were the factors that mostly motivates students. Springate (2008) observes that family influence as well as images of scientists and the work they do act as medium influence factor.

Physics being a fundamental subject in our society and a major ingredient of science and technology, needs urgent readdress in terms of enrolment. There is need to investigate what factors influences students' choice of physics as a course of study in the University, leading to low enrolment and possibly try to improve on those factors early enough to increase the enrolment in the future. Identification of the underlying reasons is of significance to widen our understanding of the problem relating to physics education and uncover possible differences across different environment and cultures. Hence this study

intends to capture these factors in Nigerian context and Ahmadu Bello University Zaria as an example.

Objectives of the Study

This study has the following objectives:

1. To Investigate the Influence of Family Background on Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University Zaria.
2. To Find out the Influence of Gender Difference on Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University Zaria.

Research Questions

The study attempts to find answers to the following research questions:

1. Does Family Background Influence Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University Zaria?
2. Does Gender Difference Influence Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University Zaria?

Methodology

The study adopted a descriptive survey research. The population of the study comprises of all the 2011/2012 session B.Sc. (Ed) students (Ranging from 100-400 Level) in Science Education department, faculty of Education, Ahmadu Bello University Zaria. The total number of (162) students (119 Males and 43 Females) was used in carrying out the research. This gives an equal opportunity for each individual in the population to be selected for the study. A two section (A & B) structured questionnaire comprising of 15 items was constructed by the researcher to gather the required information. The instrument had undergone both validity and reliability test. The validity test was done by two (2) experts in Institute of education, Ahmadu Bello University Zaria and the corrections made were implemented. The reliability coefficient obtained was 0.75 through a test re-test method. The Questionnaire was administered personally to the sample population by the researcher with the assistance of other course mates and later retrieved back for analysis.

Data Analysis

The data collected for the study was analysed using descriptive statistics (frequency, percentages, pie chart, bar charts). The data obtained were transcribed and translated.

Results

1. **Research question 1**: Does Family Background Influence Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University Zaria?
   Item Six (6) of the questionnaire investigated the occupation of parents of the respondents. The data generated was used to draw out table 1.

Table 1: Occupation of Undergraduate Physics Education Students Parents

Occupation	Frequency	Percentage
Farmer	**27**	**16**
Politician	**16**	**09**
Successful Businessmen	**43**	**27**
Teacher	**27**	**16**
Medical Officer	**05**	**03**
Clergy	**05**	**03**
Bricklayer	**05**	**03**
Retired Civil Servant	**16**	**09**
Civil Servant	**23**	**13**
Total	167	100

The result in Table one (1) shows that 16% of the respondents have their parents as farmers, 9% as politicians, 27% as successful businessmen, 16% as teachers, 3% as medical officers, 3% as clergy men, another 3% as bricklayers, 9% as retired civil servants, and 10% as civil servants. This clearly indicates that most of the respondents have their parents as successful businessmen.

Item Seven (7) of the questionnaire investigated the extent to which parents were able to meet the financial needs of their children in the university. The data generated was analysed and used to draw out table two (2).

Table 2: Parental care and welfare on Undergraduate Physics Education Students

Response	Frequency	Percentage
Highly Satisfactory	**38**	**23**
Satisfactory	**102**	**61**
Fairly Satisfactory	**16**	**09**
Not Satisfactory	**11**	**07**
Total	167	100

It is clear from table 2 that 23% of the respondents were highly satisfied with the extent to which their parents meet up with their financial needs here in the university, 61% where just satisfied, 09% were fairly satisfied and only 7% were not satisfied.

This suggests that a greater percentage of the respondents were satisfied with extent to which their parents meet their financial needs in the university.

2. **Research Question 2:** Does Gender Difference Influence Students' Choice of Physics and Academic Achievement among Undergraduate Students of Ahmadu Bello University Zaria?

Item Eight (8) of the Questionnaire investigated the number of undergraduate physics education students per level. The data collected was analysed and tabulated in table 3 as follows:

Table 3: Number of Undergraduate Physics Education Students Per Level in 2011/2012 Session

Level	Frequency	Percentage
100	**27**	**16**
200	**45**	**27**
300	**67**	**40**
400	**28**	**17**
Total	167	100

Source: Science Education Department Ahmadu Bello University Zaria (2011/2012 Session)

Table three (3) indicated that at 100 Level, there are only 27 students representing 16% of the total Undergraduate physics education Students. At 200

Level, there are 45 students (27%), 300 Level consists of 67 students (40%) and finally at 400 Level, there are 28 students equivalent to 17% of the total students.

Item Nine (9) of the questionnaire investigated the percentage of male and female undergraduate physics education students of Ahmadu Bello University Zaria. The data obtained was analysed using table four (4).

Table 4: Physics Education Students by Gender

Level	Male	Female	Total	% of Male	% of Female
100	**15**	**12**	**27**	**56**	**44**
200	**31**	**14**	**45**	**69**	**31**
300	**52**	**15**	**67**	**78**	**22**
400	**21**	**07**	**28**	**75**	**25**
Total	119	48	167	100	100

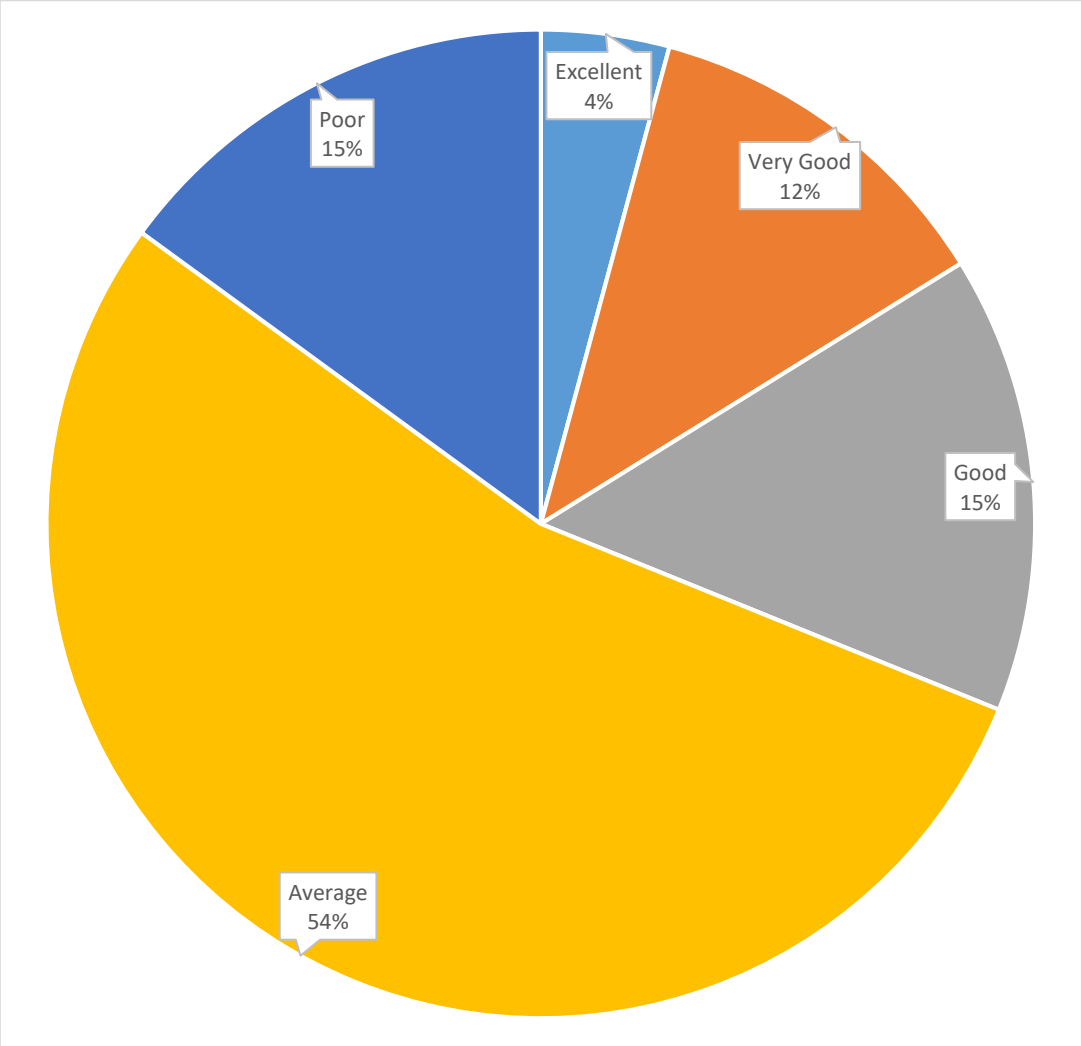
Source: Science Education Department, Ahmadu Bello University Zaria (2011/2012 Session)

Table four (4) shows that at 100 Level, there are 58% Male Students and 44% female students. At 200 Level, the percentage of Male Students is 69% while that of Female Students is 31%. 300 Level has 78% Male Students and 22% Female Students while at 400 Level, Male and Female Percentage are 75% and 25% respectively.

Also, table four (4) shows that there is preponderance of Male Gender in Physics Education with a total number of 119 (71.3%) Students greater than the number of Female Students which stands at 48 (28.7%). This implies that Physics Education is a Male Stereotype.

Item Ten (10) of the questionnaire investigated the performance of female undergraduate physics education students. The data generated was analysed and used to draw Figure one (1).

Figure 1: Showing Physics Education Female Students Performance

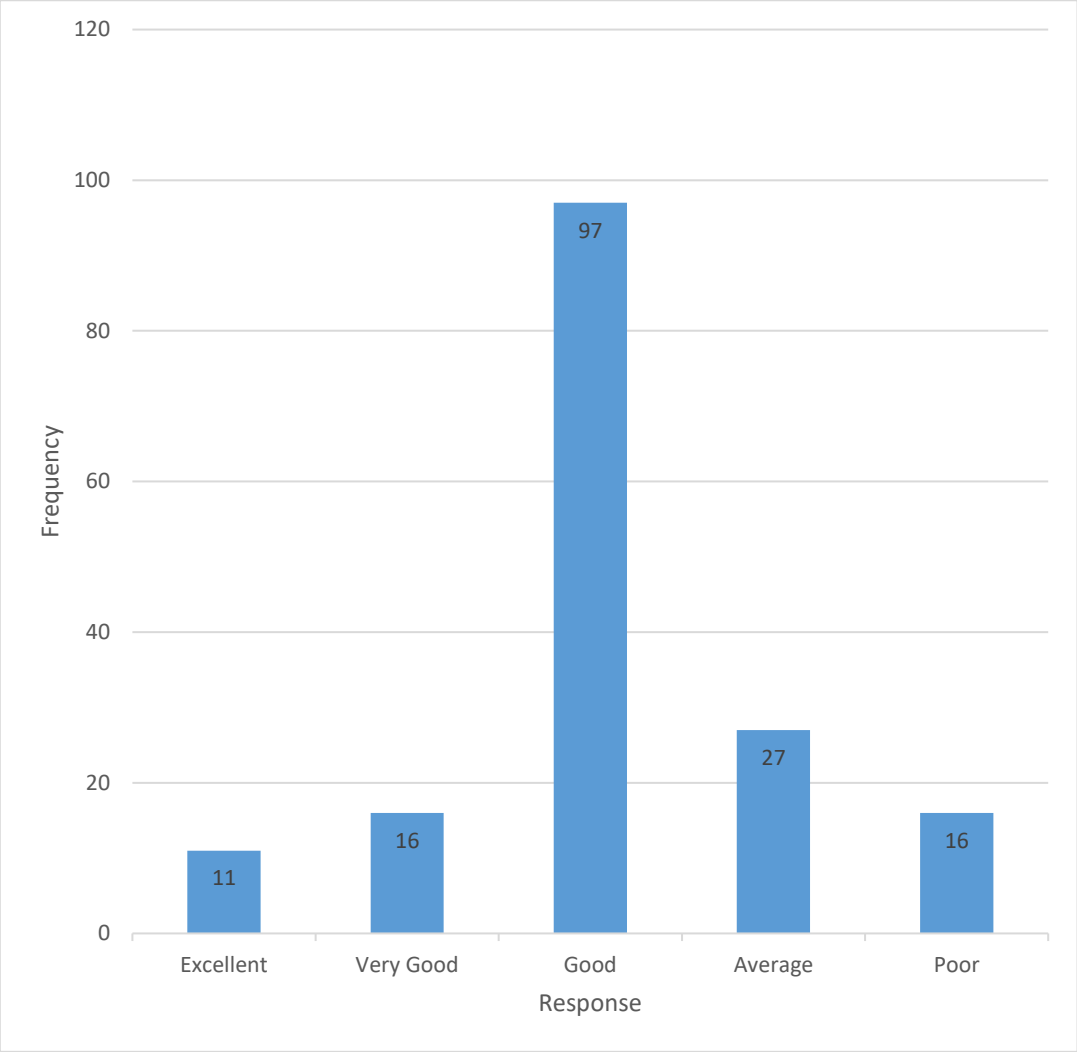


The figure one (1) above shows that 12% representing 20 respondents observed that the female students' performance is Very Good. Only 4% (7 Respondents) agreed that the performance of female students is Excellent while 15% (25 Respondents) believed that the female students performance is Poor. Another 15% representing 25 Respondents agreed that the female performance is Good, and finally 54% (90 Respondents) observed that the female students' performance in physics is at the Average level.

It is therefore means that most of the B.Sc. (Ed) female students have an average performance in physics.

Item Eleven (11) of the questionnaire investigated the performance of male undergraduate physics education students. The data obtained was analysed and used in drawing Figure 2.

Figure 2: Showing Physics Education Male Students Performance



The result in Figure two (2) shows that a frequency of 11 (6.6%) of the respondents admitted that male undergraduate physics education students have excellent performance, 16 (9.6%) agreed that the male students have a very good performance, 97 (58.1%) observed that the male students have good performance, 27 (16.2%) of the respondents believed that the male students have an average performance whereas 16 respondents representing 9.6% argued that the performance of male undergraduate physics education students is poor. This therefore suggests that majority of the male undergraduate physics education students have a good performance.

Item 12 (Twelve) of the questionnaire investigated the level of satisfaction of the physics education students' performance. The data generated was analysed and used to draw figure three (3).

Figure 3: Showing Level of Satisfaction of Undergraduate Physics Education Students' Performance

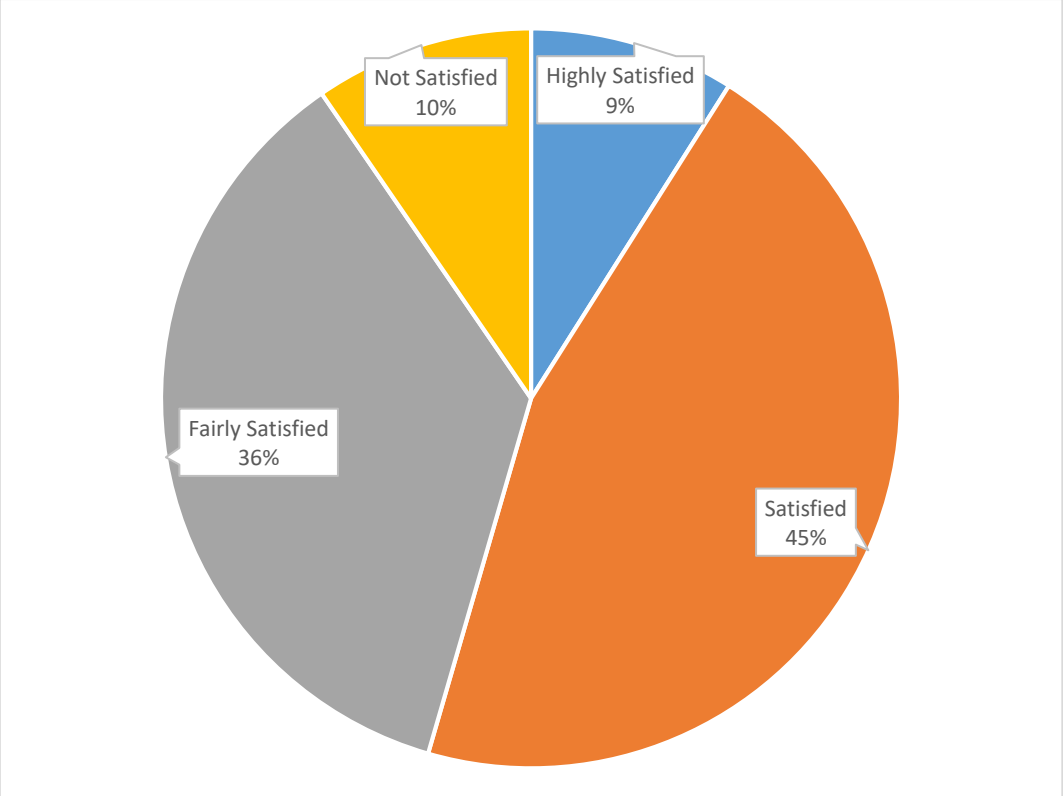


Figure three (3) shows that the majority of the respondents, 76 in number (45%) were Satisfied with their performance, followed by 60 (36%) respondents who were fairly satisfied with their performance. Sixteen respondents (10%) believed that they were not satisfied with their performance, whereas 15 (9%) respondents argued that they were highly satisfied.

Discussion of Results

a. From table one (1), it is clear that 27%, a greater percentage of the respondents have their parents as successful businessmen. Similarly, Table two (2) indicates that 61% of the respondents (also a greater percentage) agreed that they were satisfied with their financial needs in school. At the same time, figure three (3) shows that majority of the students were satisfied with their academic performance.

   This finding answers the research question one (1) which reads "Does family background influence students' choice of physics and academic

achievement among undergraduate students of Ahmadu Bello University Zaria?"

Also the result is similar to that of Lyons (2004) who found out that some students saw the high status of their parent credentials or occupation as representing what could be achieved through University study.

b. Table four (4) shows that 71.3% B.Sc. (Ed) students were males while only 28.3% of them were females. Also figure one (1) shows that majority of the female students have an average performance while figure two (2) shows that majority of the male students have a good performance greater than that of the female students. This suggests that gender is a factor that influence students' choice of physics and academic achievement among undergraduate students of Ahmadu Bello University Zaria and therefore answers the research question 2 (Does gender difference influence students' choice of physics and academic achievement among undergraduate students of Ahmadu Bello University Zaria?).

The findings are also similar to that of Hoffmann (2002). He opined that the gender difference that exist between male and female students seem to be sufficiently explained by the gender differences of other variables, especially by differences in self-concept.

Conclusion

From the data generated and analysed, it was found and concluded that:

a. Family background influence students' choice of physics and academic achievement among undergraduate students of Ahmadu Bello University Zaria.
b. Gender difference also influence students' choice of physics and academic achievement among undergraduate students of Ahmadu Bello University Zaria.

Recommendations

With reference to the findings of this research work, the following recommendations are made on how to improve students' enrolment as well as academic achievement in physics.

1. Parents should invest more toward educating their children.

2. The limiting of female choices of career should be discouraged by parent in particular and the society in general.
3. Proper orientation on career guidance and choice should be given to students as earlier as possible; therefore, government through the universities should improve the setting, furnishing as well as employing qualified of counsellors for students' academic problems and guidance most especially in the universities.
4. Science symposiums should frequently be organised by science department lecturers in our universities to attract the interest of more students towards science based courses.

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