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# SOCIO-ECONOMIC STATUS AND GENDER DIFFERENCES IN THE SELECTION OF SCIENCE SUBJECTS IN SENIOR SECONDARY SCHOOLS IN KANO METROPOLIS

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## Abstract

*This study is set to primarily investigate the issues of gender socio-economic status differences in the selection of science education in some selected secondary schools in the Kano metropolis. Gender disparity in the study of science-oriented courses was one instrumental reason which participates in the study. The research design is non-experimental and qualitatively descriptive, as the subjects of the study will not be completely manipulated by the researcher. Data were drawn from a randomly selected sample of 356 out of a population of 4640 students drawn from some selected schools in the area of study. A researcher made questionnaire was used for the study. $X^2$will be used to analyze the hypotheses and descriptive statistics to answer the research question.*

## Introduction

There is a huge difference in the trend of choice and participation in science and vocational technical courses by gender in most schools. A gender group is more participatory in some courses or subjects and all other more represented in different areas of study to the extent that some subjects are socially regarded as masculine (male-dominated) and others feminine (female-dominated) (Hassan 2005; Dahiru 1995 and Debra 1992). The existence of gender differences in education exhibits non-compliance with the policy statement (National Policy on Education) which emphasizes on the provision of educational opportunity for all individuals, handicapping and gender differences notwithstanding.

The existing gap or imbalance in gender education in science-based course is triggered by socio-economic factors from the hub of this study in other words, the socio-economic factor.

This study evolved out of the problem stated, i.e. that of existing gender differences in science-based subjects. This study attempts to investigate the role of both differences of socio-economic backgrounds as well as those in gender in the selection of science subjects. The main problem in this study is to primarily examine the socio-economic background differences in gender and how they affect the gender choice of science-based subjects in secondary schools. The main focus is essentially on the influence of the socio-economic factors determining gender differences in science subjects.

**Objectives of the Study**

The objectives of the study are:

i. To determine the role of socio-economic status on gender in the selection of science subjects.
ii. To find out whether there are any gender differences in the selection of science subjects.

**Research Hypotheses**

The following are the research hypotheses:

i. There are no significant gender differences in the selection of science subjects in secondary schools in Kano.
ii. There are no socio-economic differences in the gender selection of science subjects in secondary schools in Kano.

**Conceptual Framework**

**Definition of Gender**:

Elucidating explanation and definitions provided by a plethora of scholars and researchers (Debra, 1995; Roser, 2000; Redford, 1995; Naremore, 1982; Flanshburgh, 2000; Anderson, 1978; Ibrahim, 2005 and Smith, 2002 as reported in Hassan, 2005 and Dahiru, 1995) on the concept (gender) have plainly indicated that the term is used to connotatively and denotatively imply two important meanings. In other words, the term is associated with two distinctive meanings: first, the meaning is biologically related, i.e. gender is used biologically to refer to the general difference between male and female without any assumption regarding

sociologically related issues. In this regard, gender is used based on the biological differences of being male or female. This equally refers to the classification of humans based on distinctive physical features as either being male or female. In common usage, gender refers to the difference between men and women (Debra, 1995; Hassan, 2005). Second, gender is defined by the types of social roles attached in gender.

**Gender Differences**

Psychologists (Unger and Crowford, 1996; Elliot et al, undated) have argued that the two terms "sex" and "gender" must be clarified carefully and unambiguously before attempting to define gender differences. According to them, sex refers to the biological maleness or femaleness and gender suggests psychosocial aspects of maleness or femaleness. Unger and Crowford (1996) and Martin, Wood and Little (1990) explained that gender difference is synonymously associated with gender identity and gender stereotyping. Gender identity is the conviction that one belongs to the sex of birth. On the other hand, gender stereotyping refers to the belief about the characteristics associated with being male or female. Both terms have in them aspects of gender differences, since each is associated with either belief or identify to being male or female. Gender differences is a broad term which involves the identification and stereotyping of being male or female of social or culture role, physical features and behavioural patterns (Elliot et al undated; Martin et al, 1990 and Lott, (1989).

**Observable Differences in Social Roles and Behaviour**

Boys may be born boys and girls may be born girls, but it does not take them long to discover which behaviours "fit" boys and which "fit" girls (Fagot et al; 1992). Children have the cognitive competency to acquire their own gender identity, role and behaviour, by 2-3 years of age (Elliot et al; undated). Lott (1989) reported that by pre-school age, most children are well aware of their own gender and begin to make decisions about appropriate behaviour based on sex. He (Lott, 1989) reported the result of a study that required children from 2-7 years of age to assign various occupational roles to either male or female occupations to male dolls. For example, 67% of 2-year-olds chose the male doll to be a doctor.

## Attitudinal Differences in Gender Selection of Science Subject

Attitude is a term used by psychologists to refer to one's psychological disposition, inner feelings and psychologically developed perception (Ausubel, 1967; Dececco, 1988; Gagane, 1966; Traft and Foster, 1974; Murrel and Marton, 1974; Xue, 2006 as reported in Hassan (2005). Attitude can simply be described as one of held feelings, belief, perception and psychological imagination towards something, situation and events. One's trend of attitude determines the way an individual exhibits positive or negative behaviour toward objects, things, people and situations. Sorenson (1989), Johnson (1979) and Hargreaves (1992) have further illustrated that likeness, dislikeness, love, hatred, indifference and value attached shown or exhibited by an individual towards people or things are the actual manifestation and product of one's attitude. Based on this evidence from scholars, one can rightly say that one's attitude can be measured and assessed in relation to exhibited observable behaviour.

## Gender Differences in Education

Shua'ibu (2005) traced the historical trend of unequal gender educational opportunity in education and science. He indicated that Arab people up to 600 AD held negative impressions on the female gender and associated them as sources of shame to the family and society. In the $18^{th}$ century, women in Europe were viewed as sources of evil. In Africa, women were restricted in participating in certain social issues and restricted to domestic issues. This instance of negative perceptions about women and their restricted role has greatly influenced their educational status and opportunity, as they had limited roles. Unlike men who have diversified social roles, their women education should, therefore, be restricted to match with their restricted roles. This wrong hypothesis was the first negative influence on gender differences in education the world over (Olarundare, 1989).

## Influential Factors to Gender Differences in Science Subjects

Different explanations have been advanced as the reasons for gender stereotyping in science and vocational technical courses. Researches were also conducted and many influential factors responsible for the trend have been discovered. Previous researches on this aspect include Bratt et al. (1984); Cockburn (1985); Whyte (1986); Cully (1988); Gati (1992) and Radford (1998). Some of the identified factors by the researchers include:

i. Social and cultural factors;
ii. Social roles attached to gender;
iii. Socio-economic background;
iv. Career aspiration in the future;
v. Psychological disposition;
vi. Peer influence in the choice of course;
vii. Inadequate proper counselling services in schools;
viii. Poor secondary schools background in some subjects.

Archer and Freeman (1989) and Radford and Hold Stock (1998 as reported in Hassan, 2005) maintained that the main influence in gender differences in education came from wrong perceptions about some subjects, because some are wrongly perceived as masculine and others feminine.

**Socio-Economic Background**

Recent studies conducted by researchers (Brezendine, Michael Gorian, 2008 and Poola and Kuriloff, 2008) to determine the connection of gender and socio-economic background in science education used an instrument called the gender gap index (GGI), a measurement of access to education and well-paying jobs developed by the World Economic Forum. The finding of the studies showed there was a huge economic disparity, such as sponsorship to boys other than girls. As such, boys were more encouraged to enroll in science-oriented courses, which were the most expensive, while girls were relegated to study cheap ones.

**Gender Socio-Economic Background Differences in Science Education**

On the influence of socio-economic background on gender differences in education, researchers abound to justifiably show the related influence the world over. In Africa, research findings (Dahiru, 1985; Ahmad, 2003; Olorundare, 2000; Shua'ibu, 2005 and Ibrahim, 2005) have shown that parents and guardians of low economic status preferred to invest in and sponsor male education to the detriment of female education. This was based on the assumption that males were expected to take over the responsibility of looking after the family, than female who would be married to another family (Hassan, 2005).

## Methodology

The research design for this study is survey or descriptive. The target population included the entire students of the senior secondary schools in the Kano metropolis. The entire population of the study will be 4,640. The sample size will be the 356 randomly selected subjects out of 4,640 students of four (4) selected schools. Morgan and Krecjei (2001) proposed the formulae of determining sample size. A questionnaire for this study was designed to elicit the information required for testing the stated research hypothesis and research questions to satisfy the objectives of the study. The questionnaire is made up of two sections. Section One contains the demographic information of subjects and Section Two twenty items structured in the form of Yes or No responses. This study has content validity, because the fifteen statements in the questionnaire were made to cover as accurately as possible its stated objectives and hypothesis. The instrument is also valid because it has already been validated.

The questionnaire was distributed and collected from the subjects of the study using "on-the-spot" techniques. This means that, it was given out to the subjects allowed to fill it and collected back on the spot. This method was adopted in order to reduce the high frequency of missing the questionnaire. A total of 356 copies were distributed to correspond with the sample of the study. Out of this number, 351 were collected back from the subjects and 05 lost. In the data analysis of this research work, a non-parametric statistical test will be used to analyze the data by means of employing CHI-SQUARE to address the stated hypothesis of the study and to find out whether there exists or not a significant difference in gender participation in science education as well as socio-economic background differences in gender. The acceptability of the null hypothesis is determined by the analysis provided by chi-square. Its selection for the analysis of formulated hypothesis will be done to determine whether or not a significant difference exists between male and female choice of subjects in science.

## Findings

This study investigated gender socio-economic status and the differences in the selection of science courses in secondary schools in Kano state. It sought to find out whether there was a difference in the choice of subjects in science. In other words, gender participation in science education was investigated. The data collected from the subjects through a questionnaire

were presented and analyzed in this chapter. Discussion on the findings of the study was also presented.

**Research Hypothesis One**

There is no significant difference in the selection of science subjects in secondary schools in Kano. To test this hypothesis, data was collected from the randomly selected subjects of the study and chi-square to test the collected responses.

| **Students** | **Sciences Subject** | **Art Subject** | **Total** | **Result** |
|---|---|---|---|---|
| Male | 53 (38.4) | 22 (36.6) | 75 | $X^2$ calculated 19.8 |
| Female | 37 (51.6) | 64 (49.4) | 104 | $X^2$ C.V. 3.841 |
| Total | 90 | 86 | 179 | |

The Table above indicated that there is a significant gender difference on the choice of science subjects among the senior secondary school students, as the $X^2$2 calculated is $X^2$ = 19.8 and greater than the critical value of $X^2$ = 3.481 at dft on the 05 level of significance.

**Research Hypothesis Two**

There is no socio-economic difference in the gender selection of science subjects in secondary schools in Kano. To test this hypothesis, data was collected from the randomly selected subjects of the study and chi-square used to test the collected response.

| **Students** | **Sciences Subject** | **Art Subject** | **Total** | **Result** |
|---|---|---|---|---|
| Male | 61 (42.8) | 20 (38.2) | 81 | $X^2$ calculated 33.4 |
| Female | 33 (41.2) | 55 (36.8) | 78 | $X^2$ C.V. 3.841 |
| Total | 84 | 75 | 159 | |

The above Table plainly shows that there is a significant difference on the influence of socio-economic factors on gender attitude and the choice of subject in science, since the calculated X2 = 33.4 is greater than the critical value $X^2$ = 3.841 at df on the 05 level of significant.

## Conclusion

Gender in respect of sex needs to be fully and adequately encouraged to participate in all the aspects of education for national and human development. It should also be noted that the existence of gender dichotomy, apart from being a manifestation of education inequality, is also an infringement of human rights and a hidden or insidious killing of human potentialities. The existing problem of gender differences in science education shows that the indomitable needs of professional counselors in schools, who can provide effective guidance and counselling services to help students to discover their potentialities, make wise decisions and select subjects based on interest and ability.

## Recommendations

1. Government should come up with new policy and incentives, especially for the female gender (with parents of low economic status) to encourage gender active participation in science subjects.
2. Science primary and secondary schools for the female gender should be established, so as to provide a solid foundation for science education among females as a means of enhancing positive attitudes towards science-based subjects among them.
3. Special scholarship awards should be given to students whose parents or guardians have low economic status
4. Guidance and counselling officers should be provided in all schools to help students to make wise decisions and form the right kind of attitudes toward science subjects.

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