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RESEARCH ARTICLE

STATISTICAL ANALYSIS ON GENDER EQUALITY AND ENROLMENT OF STUDENTS IN TERTIARY INSTITUTIONS IN NIGERIA: A CASE OF SCHOOL OF PURE AND APPLIED SCIENCES - MODIBBO ADAMA UNIVERSITY OF TECHNOLOGY, YOLA, ADAMAWA STATE, NIGERIA

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Abstract

This paper examines gender pattern in undergraduate students' enrolment in the School of Pure and Applied Sciences, Modibbo Adama University of Technology, Yola. The research examines the gender intake of undergraduate students' enrolment and analysing the gender pattern of the enrolment according to course of study in Modibbo Adama University of Technology. Data on students' enrolment were collected for a period of four years and analysed using Z-Test Statistic. The results of the analysis showed that there is gender inequality in the enrolment of students in School of Pure and Applied Sciences. Some courses such as Mathematics, Physics, Statistics and Operations Research are gender bias. On the basis of this finding we conclude that the target of 2015 for Millennium Development Goals Number 3, which made emphasis on gender equality, may not be achieved. In conclusion recommendations are made on how to improve on gender equality in courses studied in our universities.

INTRODUCTION

1.1 Background of the Study

When the United Nations proclaimed the International decade for women in 1975, it was in recognition of the fact the women who represent about 50% of the World's total population did not have a fair share of the available resources and opportunities. Subsequently, women have become the focus of international conferences organized by the United Nations in Mexico City in 1975, Copentiagen in 1980, Nairobi in 1985, and Beijing, China in 1995. These conferences were aimed at integrating women into the development process on an equal basis with men and deliberations include how to promote gender equity in areas of development and education, among other issues (UNIFEM, 1995).

Globally, the process of mass education is underway. Primary level education is available in most countries while opportunity for secondary education as well as participation in higher education has increased tremendously (Mundenge, 1993; Saint, 1992; and Thiam, 1991). Sawyerr (1995) observed that spectacular increase in the adult

literacy and combined primary and secondary enrolment rates were abound throughout the continent of Africa, with about 180 Universities. *Ayaji et al* (1996) summarized the situation as follows:

> '*Currently, the percentage of women in tertiary level institution in sub Saharan Africa is only 25 percent of total enrolment and this much lower at the secondary level, and this is in turn, lower at primary level'*.

Sawadayo (1994) pointed out that one of the greatest achievement of Africa Universities since, 1980's is the high rate of student enrolment in almost all the Universities in Africa. Enrolment and increased opportunities were not distributed equitably according to gender.

While women are benefiting from the expansion of educational opportunities in the developed countries like USA, Canada, Finland and France cultural and economic barriers prevent women both in gaining access to formal education and in enjoying the same range of educational opportunities offered like Nigeria (UNESCO, 1993). This is why Ardayfio-Schandorf (1995) indicates that:

> *'Girls are not reaching the Universities and tertiary institutions in Africa which are crucial in effective participations in development at highest levels'*.

The objective of this study is study the gender characteristics of students' enrolment into Modibbo Adama University of Technology, Yola with the aim of understanding the distribution of gender in terms of enrolment by:

i. Examining the gender intake of undergraduates students enrolment into Modibbo Adama University of Technology, Yola; and

ii. Analysing the gender pattern of enrolment according course of study.

The study would help policy maker to address the issue of gender inequality in terms of enrolment in tertiary institutions.

Hypotheses

H_o: The intake of males and females in the School of Pure ad Applied Sciences, Modibbo Adama University of Technology, Yola are the same.

H_1: The intake of males and females into school of Pure and Applied Sciences, Modibbo University of Technology, Yola are not the same.

1.2 Global Perspective of Women Enrolment into Tertiary Institution and Involvement in Research

1.2.1 Women in Higher Education Management in United States and Canada

Feathermen (1993) noted that, first at glance, USA appears to have achieved equal participation of men and women in higher education. In fact, since 1976, more women than men have been involved in college programs and in 1989/90; women were awarded 58% of all 2 years degree and 53% of the bachelor and masters degrees. Yet women have done less in professional courses and at doctoral level. Reasons given to this are fairy similar to those, which present the full participation of women in other countries such as areas of intervention for women whose role in marriage have been primarily subjected to childbearing in a number of cases sexually harassed.

1.2.2 Women in Higher Education in Finland

Stotte-Heiskanem (1993) pointed out that in Finland one third of the student in the Universities were women at the end of the 1930's but progress was slow until the 1960's when the labour demand for University training was growing and that expansion favoured women. By 1960, about one in every ten women between the ages of 20 and 29 years was in the University but women have now gained the advantage with more than half of the bachelor degree and one third of post graduate degrees being awarded to women. However, as in other countries women tend to predominate in the social sciences and humanities.

1.2.3 Women in Higher Education in Norway

In Norway, the Norwegian Institute studies in research of higher education (Nifu) investigated the recruitment pattern of students in higher education in Norway and find out that it had increased by about 50 percent and that varied according to region (Nifu,1996 P6).

1.2.4 Access to Education in the Arab World

Badran (1989) discussed access to higher education in the Arab countries and he found out that in the states women in higher education have more than doubled between 1985 and 1988. Hammond (1993) commented that in the Arab regions human resources needs were not being met by its policies on admission to higher education. He observed that 35 percent of students are women and that there is unequal distribution of access according to discipline with few women in non-traditional fields such as engineering most of the females are in the female traditional professions which are considered to be an extension of the natural roles of wife and mothers such as teaching and nursing .

1.2.5 The Place of Women in the Management of Higher education

Chitins (1993) studied the massive and structurally diverse higher education system in India with 4-5 million students and 196 Universities. She observed that the changes which the countries, former colonies, under went after independence have generally broadened access to University education.

Women entry into higher education and employment came through the nurturing profession of nursing and teaching towards the end of the 19th century. This was as a result of efforts by social reformers to improve the lot of windows and other marginalized women. Gandi supported increased access to education for women but this could not change much of the deeply entrenched social attitudes, which are favourable to paid employment for women but accepted voluntary employment for them. However, economics factor in recent times, have broken the resistance of women to supplement family income and today women are well represented in all professions in India, however access to higher education is often restricted for girls who lives in rural areas and in town without colleges or Universities.

1.2.6 Indonesian Women in Higher Education Management

In Indonesia, Satiadarrma (1993) pointed out that though there are more women than men in the 16-29 age groups in secondary schools, there are still more men than women in higher education. In fact, only one out of fifteen women in this age group is in higher education. Participation rates of women are particularly low which restricts work opportunities, limits the effectiveness of women as mothers and natural teachers of the next generation and this deprives the country of the much needed expertise from women.

1.2.7 Women in Higher Education Management in the South Pacific

Thaman and Pillary (1993) found out that at the University of South Pacific girls are out-numbered boys - three to one in degree programmes. They regretted that women are not encouraged to study at the tertiary level because their family role is paramount, except where women are expected to contribute to the economy of their families. Until the University of South Pacific (USP) was established in 1968 to serve the higher education needs of the 12, small Islands in the region, higher education could only be pursued overseas and women were therefore excluded because their parents did not have the resources or confidence to send their daughters overseas. Meanwhile, the scholarship policies at home channeled women into teaching.

1.2.8 The Women's Role in the Administration of Higher Education in Peru

Zamara (1993) noted that in Peru, the demographic explosion in education since the 1940's and the pipeline effects that this increased participation has had on the primary and secondary schools graduates flowing through into higher education, come one generation later. The impact was so great that by 1918, approximately one million (or 17% of the population) were involved in higher education by 1993, females accounted for 42% of the population or students enrolled in higher education in Peru but many of them are in private colleges, which do not have University States.

1.2.9 Staff Development and Gender Equity in the Common Wealth Caribbean Universities-the Experience of the University of the West Indies

Williams and Harvey (1993) observed that in the Caribbean the proportion had increased from 32.9% in 1962/63 to 52.3% in 1985/86.

Gendreaux -Massaloux (1993) observed that in France University population had increased five folds in 30 years (1963-1993). In fact, 15% of the 18-25 years old are in higher education and half of these are women. This compares favourably with Germany where participation of women is about 40%. In both countries, men dominate in technical courses, which are most likely to lead to positions of power and higher income whole women literacy course and avoid scientific and technical subjects.

1.3.0 Women in African Universities

Eshun (1995) noted that gender inequalities is common problems both in the Universities of developed and developing countries and that inequality often existed in the choice of subjects. Karen (1991) discussed women education in developing countries. In Ghana, Ardayfio-Shendarf (1995) observed that most of the women who reach the Universities often enrolled in the faculty of arts and social sciences. She also observed that women in the Universities were at advantage in allocation of halls of residence. Andam (1995) suggested that the solution to the gender question of imbalance in boys/girls enrolment ratio in Ghana was to encourage more girls to secondary schools to enable the Universities prepare places for them. Anamuah -Mensah (1995) also suggested that immediate action taken to correct the current imbalances in Ghana by introducing the enrolment of men and women on a 50-50 basis at the Universities.

2.0 MAJOR CONSTRAINTS TO WOMEN'S ACCESS TO HIGHER EDUCATION

In Nigeria, Williams (1993) discussed the major constraints to women access to higher education. Onokala and Onah (1998) studied the recruitment, promotion and appointment of women to academics and administrative position in Nigerian Universities. They found out that although there has been an increase in the number of female yet percentage of total academic staff is still very low. There has not been any study of the gender pattern of student's enrolment in Nigerian Universities hence the need for this study.

3.0 METHODOLOGY AND MATERIALS

3.1 Method of Data Collection

During the collection of data, it was observed that some year’s data on students' enrolment are not kept according to gender but rather lumped together. Four years was considered (between 2001 and 2005). But 2002 was not included because during that time the universities in the country were on strike and there was no admission issued. All the data for these years were obtained from the Academic Planning Unit, Modibbo Adama University of Technology, Yola. The data for 2006 was not included because data for that year was not ready.

3.2 **Sample Population and Sampling Techniques**

Simple random sampling without replacement was used to select the departments in the School of Pure and Applied Sciences. Enrolment of all students between the year 2001 and 2005 in the departments selected were considered in the analysis.

3.3 Test of Hypotheses

The stated hypotheses were tested uses Z-Test explain as follows

$$Z = \frac{pi - pj}{\sqrt{\frac{PiQi}{ni} + \frac{PjQj}{nj}}} \sim N(0,1)_{\text{at}} \propto = 0.05$$

Where

Pi = the proportion of males

Pj = the proportion of females

Qi = One minus the proportion of males

Qj = One minus the proportion of females

ni = The number of males

nj = The number of females

Decision Rule

If $/Z_{cal}/ \leq Z_{tab}$, reject null hypothesis (i.e H_0), otherwise accept (H_0).

4.0 RESULTS AND DISCUSSION

4.1 Results

Table 1: Total Students Enrolment by Sex between the Periods 2001-2005

S/N	Department	P_1	P_2	n_1	n_2	Z_{cal}	Decision
1.	Biochemistry	0.5500	0.4500	99	81	1.3416	Accept
2.	Geology	0.7538	0.2462	98	32	5.7872	Reject
3.	Mathematicss	0.8462	0.1538	33	6	4.3246	Reject
4.	Computer Science	0.6706	0.1538	169	83	12.006	Reject
5.	Physics	0.8989	0.1011	80	9	7.5272	Reject
6.	Statistics	0.8780	0.1220	36	5	4.8399	Reject
7.	Operations Research	0.8969	0.1031	87	10	7.8179	Reject
8.	Biological Science	0.7000	0.3000	91	39	4.5607	Reject
9.	Microbiology	0.6144	0.3856	94	59	2.8301	Reject
10.	Chemistry	0.7207	0.2793	80	31	4.6503	Reject

Critical value $Z_{0.05}$=1.96

Table 2: Gender Pattern of Enrolment According to Discipline in School of Pure and applied Sciences between 2001 and 2005

S/NO	Programme	M	F
1.	Biochemistry	99	81
2.	Geology	98	32
3.	Mathematics	33	6
4.	Computer Science	169	83
5.	Physics	80	9
6.	Statistics	36	5
7.	Operations Research	87	10
8.	Biological Sciences	91	39
9.	Micro Biology	94	59
10.	Chemistry	80	31
	TOTAL%	**70.95**	**29.05**

P_i = 0.7095, P_j = 0.2905

Q_i = 0.2905, Q_j = 0.7095

n_i = 867, n_j = 335

Zcal = 17.1782

Ztal = 1.96

4.2 Discussion of Results

In the table above the proportion of males in each of the Department except Biochemistry are more than those of the females. A vivid observation revealed that courses such as Mathematics, Statistics, Physics and Operations Research are male biased in terms of gender enrolment.

In all other departments the hypothesis is rejected. This is an indication that male enrolment is more than female enrolment in school of Pure and Applied Sciences.

According to the Millennium Development Goals Number 3, the gender equality shall be met by year 2015. This goal may not be fulfilled if the observed trend enrolment in the various departments in school of Pure and Applied Science is not checked.

Table 2 presents the gender pattern of students' enrolment in these programmes in School of Pure and Applied Sciences FUTY.

Since Z_{cal} is greater than Z_{tab} we then reject the null hypothesis that the intake of male and female is the same.

This result shows that in all the programmes considered in School and Pure and Applied Sciences Federal University of Technology, Yola, the intake of males and females are not the same. The enrolment of males in all the courses is more than that of female.

5.1 Conclusion

Having examined the intake of undergraduate students' enrolment in School of Pure and Applied Sciences in Modibbo Adama University of Technology, Yola and subjected the data obtained to statistical analysis, we observe that the pattern of intakes between males and females is not uniform. Our analysis indicated that more males are enrolled in the school than female.

The result of this study indicates that in School of Pure and Applied Sciences in Federal University of Technology, Yola there is no gender equality in the students' enrolment in the various programmes. Men dominate most courses, while women avoid courses like Physics, Mathematics and Statistics.

Based on an interview result conducted, students opinion shows that since most of the Deans of School of Pure and Applied Sciences in Federal University of Technology, Yola are males, they may not be even aware that gender equity is an important issue for the school. It is therefore recommended that the school be sensitized to realize this problem so that they can encourage attempts to solve or reduce gender inequality in the school to meet and sustain the target of Millennium Development Goal Number three.

More women can participate in some of the technical courses by reducing the cut-off marks for admitting females' students and also it can be advertised so that parents who are ignorant will encourage their children to do some of those courses.

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