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Trends in enrollment, graduation and staffing of science and technology education in Nigeria tertiary institutions: A gender participation perspective

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Prominence has been given to science and technology (S&T) education of women in recent years. This is because they constitute a critical mass of non-harnessed potentials in the country that if given the opportunity, would contribute to national development. Thus the objective of this work was to study the enrollment, graduation and staffing pattern of the male and female gender in S&T fields in tertiary institutions within a span of 10 years (1997-2006), specific motivational factors for S&T education and factors influencing their choice of career. This was with a view to develop appropriate policy interventions that would enhance women's educational participation in S&T. The study employed the use of structured questionnaire and personal interviews to obtain primary data from 2110 females in universities, polytechnics and colleges of education in the field of engineering and natural sciences in the six geopolitical zones of Nigeria using stratified simple random sampling. Secondary data were also used. Descriptive statistic was employed for data analysis. The result of the study provided information on enrollments and graduation figures, performance, motivational factors and career advancement of the females. The study compared the data obtained from Nigeria with that from United States, United Kingdom and other African countries to identify cultural differences and similarities.

Key words: Science and Technology, enrollment, graduation, education, female.

INTRODUCTION

The equitable distribution and creation of science and technology is a necessary prerequisite for the development and improvement of the human well being. In a climate of significant national and global economic restructuring, it is critically important that the nation's work force attain and maintain a state of technological and scientific readiness that will enable it to thrive in the global economy. To ensure this readiness, it is essential that the potential of all sectors of the population be fully developed. One way of doing this is by building and encouraging scientific literacy.

The participation of women in S&T education has been and is still low around the world (Kishore, 2008; McCarthy,

2003; Ellis, 2003; Schwedes, 1996). The United Nations has recognized women's central role in development and the importance of understanding the gender-differentiated effects of development planning. The Platform of Action of the Fourth UN World Conference on Women (1995) noted that women's empowerment and their full social participation are prerequisites for the achievement of equality, development and peace. Generally, women are under-represented in almost every area of recognized scientific activity (Kishore, 2008; McCarthy, 2003) though participation is increasing in the 21st century (British Council, 2001). Issues of gender mainstreaming have also led to advance studies and women participation

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in S&T.

In order to 'engender' national and international data collection, it is necessary not only to understand and indicate statistically how female S&T enrollments and graduation situations differ from those of men. The UN Conventions such as the 1995 World Conference on Women held in Beijing and the World Conference on Science held in Budapest in 1999 have called for the collection of gender-disaggregated data reflecting women's economic and science and technology contributions.

In the developed nations, attempts are made to get more women into science and engineering careers for reasons related to economics, equality of access, relative employment stability and utilization of talent, as well as personal satisfaction and intellectual challenge for the women involved (Ellis, 2003; Oldham, 2000). Women trained in S&T constitute an under-recognized but important potential resource. If women and other groups and cultures are excluded, other viewpoints of the world are being lost. Employers such as Unilever (Nigeria affiliate of the U.K Lever Brothers and the makers of detergents, tablets soaps among other products) and Rank Xerox (manufacturers of office equipment e.g. photocopiers) are looking forward to developing more women as they move towards a culture in which diversity is valued (British Council, 2001). A diverse workforce is a more creative workforce capable of challenging old attitudes and practices and bringing fresh thinking and greater innovation to product development.

Problem statement

Women trained in S&T, though an important potential resource, are under-recognized. There is little empirical data on gender participation in science and technology education in Nigeria; this calls for the need for research and dissemination of data. A better statistical understanding of women's educational participation will improve policy making at the national, regional and international levels. From studies, the following questions arise: what is the pattern in male and female science and technology enrollment, graduation and staffing in tertiary education? Do women have greater difficulty entering science and technology courses? What are the specific motivational factors for women who venture into science and technology fields? Are there more women in biological sciences than in the physical science courses? What are the challenges that female S&T graduates face in and out of school? Thus this study attempts to provide answers to the questions by studying the enrollment, graduation and staffing pattern of the male and female gender in S&T fields in tertiary institutions within a span of 10 years, specific motivational factors for S&T education and factors influencing their choice of career. This was with a view to developing appropriate policy interventions to

enhance human resources planning.

LITERATURE REVIEW

The number of women in tertiary level S&T education and in S&T professions is low around the world (McGregor and Hardings, 1996; McCarthy, 2003; Kishore, 2008): In Japan in 1992, women made up less than 8% of scientists and engineers in scientific institutions. Among engineering specialties in the US, chemical and metallurgical/materials were the only two occupations in which women were more highly represented than the overall percent of total women engineers. Women made up 17% of all industrial engineers, 12 % of metallurgical/metal engineers, and 11.5% of chemical engineers. Among all other engineering specialties—aerospace, mining, petroleum, nuclear, agriculture, civil, electrical or electronic, mechanical, marine, or naval architects- women represented fewer than 11%. Furthermore, three out of ten computer systems analysts, engineers, and scientists were women. In addition, one out of four computer programmers was a woman. Among natural scientists, women represented 51.6% of medical scientists and 44.4% of biological and life scientists, but accounted for a smaller portion of geologists and geodesists (24%), physicists and astronomers (7.7%) (CPS, 2001). This trend suggests that female scientists are higher in number in the medical/biological sciences.

A closer look at doctorates earned in the United States by women as reported by Colwell (2005) shows a divergence among the disciplines. Women earn around 40% of all doctorates. However, this differs greatly by field. In the life sciences, women earn over 40% of doctorates. But in the physical sciences and mathematics, women earn fewer than 20%. In engineering, they receive a little over 10% of PhDs. While it is true that between 1981 and 1992, the proportion of women in the sciences, engineering and technology workforce rose from 8.5 to 29.5% in 1991, women accounted for only 2-6% of employees in traditional engineering jobs, 11-12% of employees in electronics, planning and quality control jobs, 20% of chemical scientists and 33% of biological scientists.

The percentage and position of women in science and technology are frequently changing and are not necessarily improving at a constant rate, though when they do; it is for various social and economic reasons. High participation rates of women in science in Latin American universities can be attributed to the effects of structural adjustment programmes (SAP) which have hit the universities especially hard. Men are therefore moving from the universities to higher-paid positions in the private sector, leaving more openings for women. Another trend concerns the representation of women in science and technology in the former Communist bloc, which has fallen drastically in the last 10 years. In fields where

women's participation seems high, closer inspection can show that they are marginalized or concentrated in the lower ranks of their field, for example, as instructors, research assistants and lecturers. A study of science staff in ten African universities showed that women were consistently less represented in each teaching rank, and increasingly less so as one moved up the university hierarchy (Huyer and Weltholm, 2000)

In Africa, while the overall enrollment of women in higher education is still much lower than men's, enrollment in science courses is lower still. At the University of Science and Technology in Ghana in 1986/87, women made up 16% of students in the natural sciences, 2.1% in engineering, 21.9% in the medical sciences, 10.2 % in the Faculty of Agriculture, and 10.9% in the Faculty of Architecture. A 1992 study showed that less than 10% of the total enrollment in science and engineering courses in Nigerian universities are female (STAN,1992). Although there is little information on women's participation in S&T education in developing countries, one study on women's enrollment in tertiary-level engineering, medical, and health-related courses in Africa, Caribbean and Latin America and Asia shows that rates of participation in the engineering courses range from 1.6% in Kenya to 26.5% in Colombia; and for medical and health-related courses, where women are more highly represented around the world, the rates range from 24.7% in Kenya to 68% in Nicaragua, the exception being a participation rate of 77% in the Philippines (Huyer and Westholm, 2000)

Socio-cultural attitudes strongly influence the level of women's participation in higher educational institutions. Attitudes that women's reproductive responsibilities are not compatible with a career can prevent women from postgraduate studies after marriage. In China, a national policy mandating a one-year maternity leave for women provided a reason for firms not to hire women. Women's reproductive responsibilities clash with their professional responsibilities. The child-bearing and intensive child-rearing years coincide with important years for gaining tenure. This is one reason that women tend to be older than their male colleagues at the same level (if they reach that level). It is frequently the women who sacrifice their education and career for the sake of the family. Those women who are supported by family or paid help to continue their careers can encounter other obstacles. Gender-role stereotyping is a major barrier for women, whether it manifests in the home, science classroom, research laboratory or the engineering and technology workplace (Armour, 2003). A woman zoologist in Kenya, for example, was discouraged from engaging in fieldwork as inappropriate for a woman. For these, among other reasons women are deserting the sciences in droves. For female students at university level in America, media studies courses win hands down over those in technology. Furthermore, those who do study science subjects either reject them as a career choice or, if they do choose that direction, do not return to the occupation for which

they trained once they have had children (McGregor and Harding, 1996).

METHODOLOGY

The six geopolitical zones of Nigeria were selected and covered in the survey by means of stratified and multistage sampling. Selection criteria for the multistage sampling include age of tertiary institution and proximity to state capitals. The sample consisted of 2,110 female students and staff as well as postgraduate colleges and exams/records unit of universities, polytechnics, and colleges of education in the fields of engineering and the natural sciences with a response distribution of 81%. Structured questionnaires and personal interviews were employed as research instruments. The questionnaires (four sets) were designed based on information from relevant literatures, critical examination of the research questions and several brainstorming sessions. The instruments were pre-tested on 3 universities, 2 polytechnics and 1 college of education in the southwestern part of the country. It was then validated to ensure that it elicited information on enrollment and graduation figures, motivational factors, performance, challenges and career advancement plans among others. Secondary data were collected from firms and institutional directories. The Statistical Package for Social Sciences (SPSS) and Excel was used for data analyses. A quantitative method of analyses specifically descriptive statistics was used. Among the descriptive statistical techniques were frequencies, means, percentages and cross tabulations.

RESULTS AND DISCUSSION

Trend in tertiary education science and technology enrollment, graduation and staffing (1997-2006)

Undergraduate enrollment

Table 1 shows the percentage of male to female undergraduate students enrolled in science courses over the years in the different zones of Nigeria. The highest percentage of female enrollment in the Southwest zone was ranging between 20 and 77%; implying that there was more awareness for female students to study science courses over the last six years. The percentage was generally low in the Northern zones with the highest of 40% compared to the Southern zones except for Northeast in 2002 where we had as high as 69%. There has been a gradual increase in enrollment data of both male and female students in science courses in tertiary institutions (Table 1) between 1997 and 2006. The general increase in admission rose to 81% for male and 110% for women over the ten-year period. However, the number of female students admitted was consistently lower than that of their male counterparts over the ten-year period studied. The national average ranged between 32.8 and 40.6%.

Enrollment in engineering courses increased over the ten-year period with greater admission number in the 2000s. Over the period, enrollment increased by 63% for male in engineering courses and by 77% for female (Table 2). Although the percentage for female enrolment

Table 1. Undergraduate enrollment by sex and region in science based faculties.

Undergraduate Enrollment (%) in Science based faculties by Region												
Year	NE		SW		NW		SE		NC		Total	
	F	M	F	M	F	M	F	M	F	M	F	M
1997	24	76	67	33	15	85	-	-	22	78	32	68
1998	24	76	60	40	22	78	38	62	27	73	34	66
1999	27	73	75	25	23	77	36	64	21	79	36	64
2000	33	67	20	80	29	71	40	60	31	69	31	69
2001	33	67	77	23	30	70	36	34	24	76	46	54
2002	69	31	71	29	21	79	38	62	34	66	47	53
2003	33	67	76	24	21	79	40	60	24	76	39	61
2004	26	74	77	23	29	71	40	60	-	-	43	57
2005	12	88	62	38	40	60	41	59	27	73	36	64
2006	34	66	67	33	31	69	-	-	27	73	40	60

NE – North East; NW –North West; NC – North Central; SW – South West; SE – South East.

Table 2. Undergraduate enrollment by sex and region in engineering based faculties.

Undergraduate Enrollment (%) in engineering based faculties by Zone/Region												
Year	NE		SW		NW		SE		NC		Total	
	F	M	F	M	F	M	F	M	F	M	F	M
1997	27	73	23	77	0	100	23	77	12	88	17	83
1998	33	67	23	77	2	98	19	81	15	85	18	82
1999	49	51	26	74	1	99	18	82	14	86	22	78
2000	43	57	15	85	1	99	18	82	11	89	18	82
2001	34	66	34	66	1	99	19	81	12	88	20	80
2002	40	60	50	50	2	98	18	82	17	83	25	75
2003	27	73	42	58	4	96	22	78	16	84	22	78
2004	21	79	48	52	2	98	23	77	-	-	24	77
2005	25	75	53	27	4	96	-	-	80	20	41	60
2006	23	77	55	45	5	95	-	-	17	83	25	75

increased, the number is still low compared to that of the male. The percentage of women in engineering courses was lower than that of women in science courses. The Northwest zone had the least percentage of female enrollments (1-5%). Percentage female enrollment in Southeast, Southwest and Northeast zones were significantly ($P < 0.05$) higher than that of the North Central zone. Southwest zone has the highest female enrollment figure with an average of 38.9%

Across the three types of institutions surveyed, the numbers of female scientists and engineers were more in the universities followed by colleges of education. The polytechnics had the least percentage of female scientists and engineering students. Generally, for both male and female students, admission into polytechnics between 1997 and 2002 was low compared to the figures provided for universities and colleges of education. However, enrollment increased in the 2000s especially in 2005 exceeding that of the colleges of education (Figure 1).

In comparison with UK and other countries in the world,

there have been significant increases in the number of women in science, engineering and technology (SET) during the twentieth century. More girls than ever before are opting to continue studying science at higher levels. In some areas such as the biosciences, above 50% of undergraduates are women in the Southeastern zone. This is similar to what obtains in the UK where there is greater participation of women in the biosciences (British Council, 2001). Apart from the biosciences, there was also greater (52%) total average participation of women at undergraduate levels in food science and technology (Table 3). This may be attributed to the stereotype that food science and technology is a female dominated field. Between 1998 and 2004, the number of women studying mathematics at University in the Southeast zone grew by 47%, while that of male grew by 59.2%. Despite the increases, women are still under-represented and under-used in SET. This is particularly apparent in the total average for physical sciences and engineering (Table 3) where the proportions of women studying in these fields

Table 3. Undergraduate enrollment (%) by sex and region in individual S&T Courses (1997-2006).

Science	SE		NE		SS		SW		NW		NC		Total average	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Mathematics	64	36	93	7	93	7	38	62	88	12	NA	NA	75	25
Chemistry	55	45	59	41	59	41	15	85	80	20	84	16	59	41
Physics	76	24	95	5	95	5	59	41	80	20	87	13	82	18
Biochemistry	59	41	NA	NA	72	28	NA	NA	NA	NA	57	43	63	37
Botany	48	52	NA	NA	71	29	NA	NA	NA	NA	NA	NA	59	41
Biology	NA	NA	55	45	27	73	22	78	78	22	65	36	50	51
Microbiology	49	51	NA	NA	74	26	NA	NA	73	27	51	49	62	38
Zoology	68	32	NA	NA	59	41	NA	NA	NA	NA	NA	NA	64	37
Geology	80	20	NA	NA	81	19	NA	NA	NA	NA	80	20	81	20
Statistics	58	42	63	37	NA	NA	NA	NA	85	15	NA	NA	69	31
Technology														
Computer Science	60	40	77	23	50	50	42	58	83	17	67	33	63	37
Electrical/Electronics Engineering	87	13	97	3	81	19	81	19	99	1	92	8	90	11
Agricultural Engineering	83	17	87	13	67	33	NA	NA	84	16	89	11	82	18
Civil Engineering	94	6	94	6	88	13	NA	NA	20	80	94	6	78	22
Mechanical Engineering	97	3	98	2	84	16	84	16	99	1	97	3	93	7
Food Science and Technology	26	74	61	39	42	58	NA	NA	NA	NA	63	37	48	52

NA = Not Available.

Table 4. Graduation figures by sex and region in science based faculties.

Year	% of enrollment by region											
	NE		SW		NW		SE		NC		Total	
	F	M	F	M	F	M	F	M	F	M	F	M
1997	20	80	73	27	17	83	27	73	21	79	32	68
1998	33	67	54	46	23	77	32	68	36	64	36	64
1999	18	82	71	29	25	75	36	64	32	68	36	64
2000	15	85	75	25	30	70	34	66	24	76	36	64
2001	26	74	73	27	31	69	38	62	55	45	45	55
2002	18	82	50	50	20	80	41	59	45	55	35	65
2003	20	80	80	20	22	78	40	60	28	72	38	62
2004	24	76	76	24	30	70	51	49	31	69	42	58
2005	18	82	86	14	42	58	34	66	35	65	43	57
2006	32	68	74	26	35	65	42	58	26	74	42	58

were still very low.

Undergraduate graduation

As the number of students admitted increased over the years, so also the number of graduating students increased. The proportion of female graduates to that of male was similar to that observed for enrollment across the zones. This underscores the ability of women to study engineering courses. Similarly to Figure 1, the numbers

of females graduating under science and engineering courses were highest in the Universities followed by the Colleges of Education, while the Polytechnics recorded the least number of female students (Figure 2). Also, the trend in Table 4 and 5 and is similar to that in Tables 1 and 2 except that in a few cases, the values are slightly higher in graduation than in enrollment. A close examination of graduation figures (2005) in S&T in other countries (Table 6) confirms that female representation in S&T fields is low around the world. This has implication not only for issues of gender equality but also significant

Table 5. Graduation figures by sex and region in engineering based faculties.

Year	NE		SW		NW		SE		NC		Total	
	F	M	F	M	F	M	F	M	F	M	F	M
1997	25	75	23	77	2	98	19	81	21	79	18	82
1998	17	83	15	85	2	98	21	79	26	74	16	84
1999	22	78	21	79	1	99	22	78	20	80	17	83
2000	36	64	26	74	1	99	20	80	17	83	20	80
2001	39	61	23	77	1	99	17	83	17	83	19	81
2002	44	56	20	80	4	96	18	82	21	79	21	79
2003	40	60	19	81	2	98	17	83	21	79	20	80
2004	34	66	25	75	2	98	22	78	20	80	21	79
2005	34	66	32	68	3	97	11	89	22	78	20	80
2006	20	80	41	59	3	97	20	80	18	82	20	80

Table 6. Tertiary education graduation in science and technology fields in 2005.

Country	Total (M/F)	% F
Iraq	29	16
Jordan	28	35
Lebanon	21	29
Morocco	27	9
Saudi Arabia	18	40
Albania	6	44
Bulgaria	21	42
Czech Republic	22	29
Estonia	20	44
Poland	14	37
Romania	23	40
Slovakia	26	35
Slovenia	18	26
Jordan	29	30
Georgia	24	38

Source: UNESCO Institute for Statistics (UIS), 2007.

impact on growth of nations especially in leveraging on the scientific and technological talents of both men and women.

Postgraduate (PG) Enrollments and Graduation

Figures 3 and 4 show the percentage of registered female postgraduate (PG) students and the percentage of graduation figures for the duration studied across the zones. The percentage of female PG students registered for S&T were lower than for undergraduate female students. This implies that fewer graduates of S&T return for PG studies. In science courses, the percentage of female PG students enrolled ranged between 10 and 41%, while that of engineering female students was between 10.9

and 33.3%. There is fluctuation in the enrollment of female PG students in S&T courses. Although the number increased slightly in the last four years, the proportion compared to male enrollment was still low ranging between 30 and 71%. The percentage of female PG students graduating in engineering courses decreased over the years. This suggests that some of the female PG students abandon their programmes mid-stream. It should be noted that many of the female PG students embark on a PG programmes but discontinue with the programme either due to employment or domestic responsibilities.

Trends in Science and Technology Staffing – Gender Perspective

The percentage of female staff to male staff in S&T courses in tertiary institutions is shown in Figure 5. The proportion of female staff in the sciences ranged between 13 and 19% while in engineering, the range was between 11.4 and 16% showing that the number of female staff in the science courses is slightly more than in engineering. There is need to encourage active recruitment of women as academic staff who will serve as both role models and mentors to the students. In the sciences, the proportion of female staff increased marginally between 1997 and 2006, while for the engineering courses, the reverse was observed with a slight decrease from 16 to 11.4%.

Challenges Encountered during the course of study by Females

On challenges encountered in the course of study, gender discrimination (39.4%) topped the list followed by sexual harassment (25.1%), financial constraint (31.4%). Other issues but of less significance (i.e. indicated by only a small number of respondents 0.6%) was domestic related or personal problems. However, a small fraction

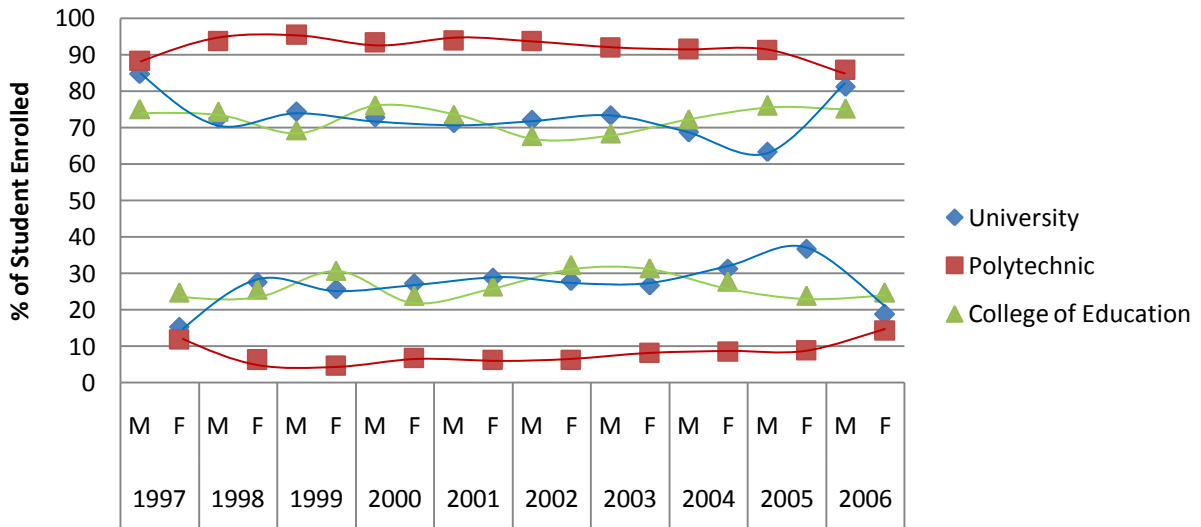


Figure 1. Trend in undergraduate enrollment in SET based faculties.

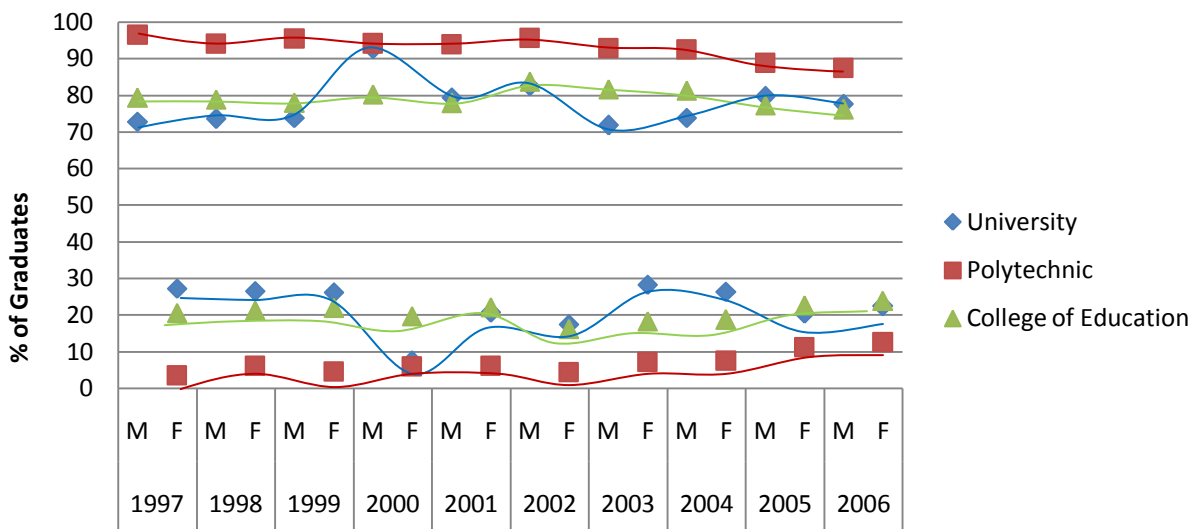


Figure 2. Trend in graduation figures by type of tertiary institution in SET based faculties.

(<1%) indicated that they found the academic curriculum challenging. Most of those who had domestic challenges were married; some had babies during the course of study and were distracted by domestic responsibilities. S&T courses are quite challenging as they demand one's full concentration, but combining this with domestic duties makes studying a daunting task.

The role of mentors

Some (49.6%) of the females studying S&T had role models that encouraged them to study S&T courses (a perceived male dominated environment), while 50.4% had no role models. Of those who had role models,

36.5% of the role models were male, while 63% had female role models. Although about 50% of the respondents had no role models or mentors but for those who had, a high proportion were female which suggests the need to publicize the successes of female achievers as this will encourage the younger ones to follow in their footsteps.

Motivation

When asked what motivated the women to study S&T courses, their responses showed that personal interest (40.8%) was the greatest motivational factor followed by academic competence (26.3%). Some 14.2% of the

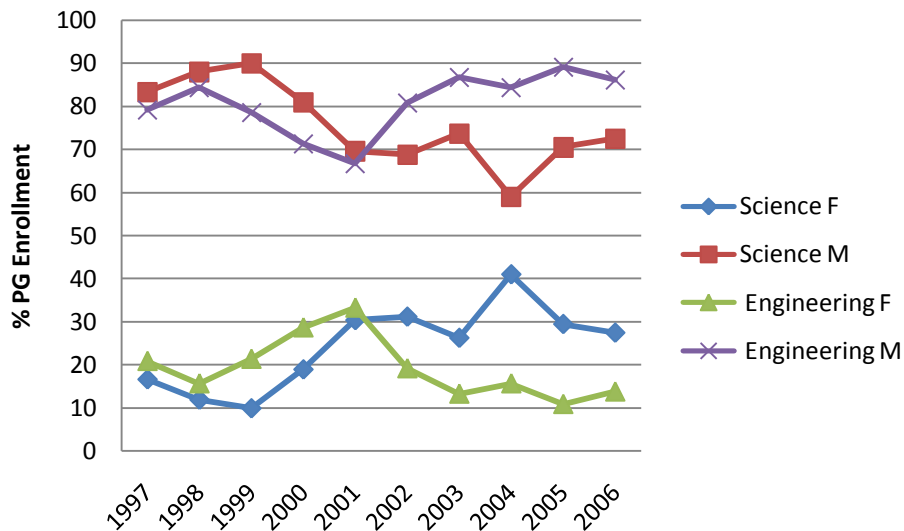


Figure 3. PG enrolment in science and engineering in Nigeria Tertiary Institutions 1997 – 2006.

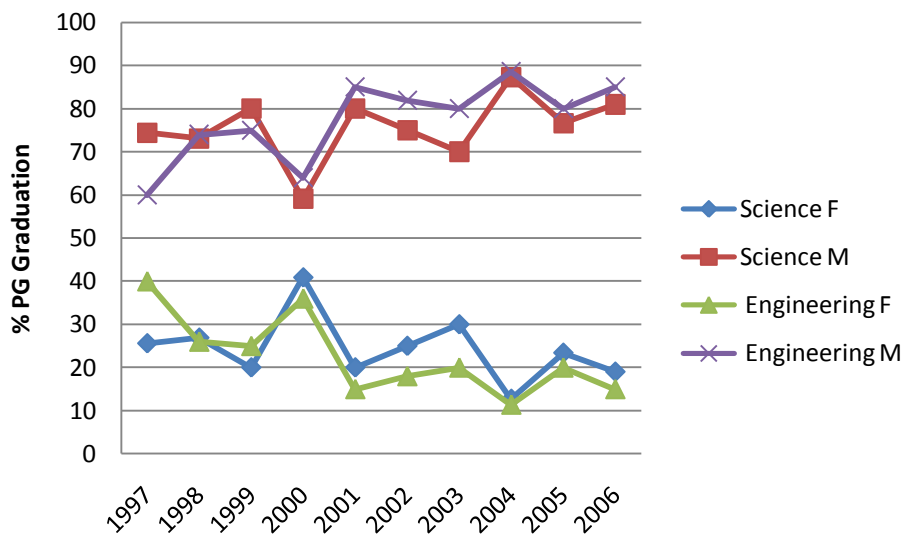


Figure 4. PG graduation in science and engineering in Nigeria Tertiary Institutions 1997 – 2006.

respondents felt they wanted to challenge the status quo (i.e. the common belief that girls cannot cope with S&T courses because it involves a lot of mathematical computations). Better financial returns from high paying jobs motivated about 17.7% of the respondents to study S&T courses. Parental influence was not a significant factor in choice of course studied as less than 1% of the respondents indicated this option. The ability to challenge the status quo is because of the endowment in understanding S&T subjects. Thus, personal interest and academic competence are the main factors motivating female students to study S&T. The brilliant academic

record on graduation of respondents does support this result (i.e. class of degree obtained on graduation).

Career advancement

A little above nine-tenth (92%) of the undergraduate students interviewed plan to acquire further qualifications. Majority (40%) plans to further their education in science; followed by 30% in engineering and 28% in social sciences and management courses. This result indicates that almost all the female undergraduate students in S&T

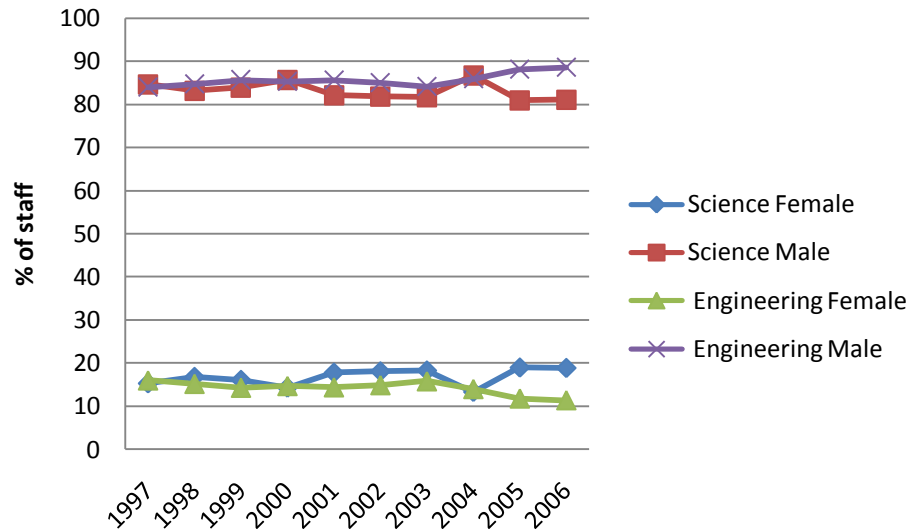


Figure 5. Percentage of staff in S&T in Nigeria Tertiary Institutions.

plans to advance in their careers.

Performance challenges

For the postgraduate respondents, performance of their reproductive functions clashed with their jobs mainly in two dimensions i) about 66.6% indicated inability to travel and ii) 33.3% identified insufficient time for research. A few of the unmarried respondents complained of serious discomfort during the monthly menstrual cycle, which sometimes necessitated time off work.

Measures for encouraging greater participation of females to study S&T

Respondents recommended the following measures to encourage greater participation of girls in studying S&T courses: i) Immediate employment (36.7%), ii) scholarships and award of bursaries (46%). However, a notable proportion of respondents (16.8%) suggested that deliberate admission quota be given to female students or applicants to ensure that a sizeable number are offered admission.

Conclusion

The result of the survey suggests that there has been increased awareness amongst female secondary school students and the interest and capability to cope or excel in S&T courses at the tertiary level. This calls for continued efforts on enlightenment of the society on change of attitudes to gender roles to enhance the acceptability of women into ventures that are referred to as male

dominated professions. Agriculture was the least desired S&T course in tertiary institutions, the nation has to popularize the study of Agriculture amongst the youths if there is to be any meaningful development in that sector.

The enrollment and graduation pattern in science and technology courses within the span of 10 years revealed that female enrollment and graduation was lower than that of males. This trend suggests that females' participation in S&T professions is likely to be affected. Similarly, the rate of employment of male S&T based staff outnumbered that of the female. This calls for government intervention to set up initiatives that will encourage greater participation of girls in studying S&T courses. Such measures could include immediate employment after graduation, scholarships and award of bursaries, deliberate admission quota to be given to female students or applicants to ensure that a sizeable number are offered admission.

A motivating factor for some of the female students was the presence of role models or mentors who encouraged them to study S&T courses (in a perceived male dominated environment). The study revealed that most of these role models are females, which suggests that there is the need to publicize and celebrate the successes of female S&T professionals and achievers as this will encourage the younger ones to follow in their footsteps.

POLICY RECOMMENDATIONS

- A review of admission policy is needed to stipulate a quota or percentage of qualified female students to be admitted into S&T courses so that the nation can benefit from the contributions of women to the S&T profession.
- There is a need to initiate affirmative actions to employ more women who studied SET in the S&T sector and

institute purposive retaining policies.

c. Provision of crèche facilities would go a long way to enhance the performance of postgraduate female S&T students during their reproductive years.

d. Enlightenment of the society on the need for a change of attitude to gender roles, as this would affect the acceptability of women who venture into the so called 'male dominated' courses. There is need to also popularize the study of agriculture and agro-allied courses at tertiary education level among secondary school female students.

e. The network for women engineers and managers should be encouraged to boost professionalism and knowledge sharing for female in their careers. There is also need to showcase successful female scientists and engineers and create a culture of mentorship and role models.

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