

## **Institutional Factors Influencing the Performance of Female Students in Science Based Courses in Post-Secondary Institutions in Nigeria**

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### **Abstract**

*This study investigated the institutional factors influencing the performance of female students in science based courses in post-secondary institutions in Nigeria. The descriptive survey research design was adopted for the study with a study population which consisted of all the female students enrolled in science based courses. A two-staged sampling procedure was adopted to select a sample size of 161. The instrument for data collection was a structured questionnaire with a reliability coefficient of 0.70. Data was analyzed using percentage, mean and Chi-square. The result of the study showed that, the overall trend was that most students scored lower grades in Science subjects than expected. However only 31% attested that there were good facilities for learning. It was concluded from the result that, the institutional factors influencing female students' performance in science based courses were poor facilities, poor lecture rooms, poor buildings, and poor meals but still approved the good learning environment, good students discipline, good neighbourliness and professional staff. Recommendation made among others was that, the government should set aside a given percentage of the funds to each tertiary level college through the Ministry of Higher Education to facilitate the implementation of the practical training programme.*

**Keywords:** *Females, Institutional Factors, Performance, Post-secondary*

### **Introduction**

Females are as capable as males in education and careers in science based courses but, several factors including institutional and non-institutional factors could influence their performance. Studies have shown that, it is common knowledge that the majority of the students in Nigerian Secondary schools dislike mathematics when comparing the two sexes (Fakuede, 1973). An historical record in Nigeria showed that females were counselled away from non-traditional educational programmes (Odipo, 2005), concentrated in educational fields leading to low-paid jobs (Heitlinger, 2007, Probert & Wilson, 2007). To add to the foregoing, Lewy (1982) reported that, females have been noted to have more negative attitudes towards science based courses and the differences between the attitudes of males and females increased as students' progress in school.

Statistics in Nigeria show that the large majority of females do not enroll in Science oriented courses at the tertiary levels of education). Between the year 2007 and 2011, approximately 207,000 female students joined tertiary institutions in Nigeria commission of Higher Education [CHE 2011]. Statistics show that between the aforementioned years 67% of the female students in the tertiary level institutions enrolled in Arts, languages, social sciences and humanity courses leaving out science oriented courses to only 33% of the female students (CHE, 2011). In Western Province, statistics indicate that 38% of the

females were enrolled in the Science oriented course. It has also been realized that the few female students who joined Science based courses usually changed their courses from Science based to Arts and language based courses once they report to the tertiary institutions, making the enrolment of females in the Science oriented courses even much smaller (Kerre, 2009).

Similar reports were given in other regions. For example, in North America, Phillips (2008) reported that, the persistence of female gender disparity has been described as being connected to historical roots in regard to beliefs and gender stereotypes and bias. These beliefs have been used as justification for different education and career paths for males and females. It remains unclear why female gender disparity persists in schools and post-secondary education, in the physical science and mathematics subjects and technology (including ICT), which lead to careers in these fields. Whereas education precedes most careers and vocations (Heitlinger, 2007), and female gender disparity persists in physical science and mathematics, and female gender disparity has been observed concurrently in education and careers, a gap in the literature in relation to why female gender disparity persists in enrolment science education.

However, several factors could influence the performance of females in science based courses. According to Hewitt (2010), factors influencing the performance of students can either be intrinsic or extrinsic or both. A Study on subject enrolment in Ethiopia by Stebleton (2007) indicated that the students had an external locus of control and believes that there are numerous external factors which influence their career choices. These external factors include; political and economic considerations, previous work experience and the influence of key individuals in a person's life. Pummel, Harwood and Lavallee (2008) reported that, external influences can help to shape an individual career aspiration, including institutional factors. Thus, this study was focused on the institutional factors influencing the performance of female students in science based courses in Post-Secondary Institutions in Nigeria.

### **Objectives**

The following objectives were stated to guide the study:

1. To find out the performance in science subjects in JAMB for the female students enrolled in science based courses in tertiary institutions in Nigeria
2. To identify institutional factors influencing female students' performance in Science-based courses in tertiary institutions in Nigeria

### **Research Questions**

The following research questions were answered in the study:

1. What is the performance in science subjects at JAMB for the female students enrolled in science based courses in tertiary institutions in Nigeria?
2. What institutional factors influence the performance of female students in science  
-based courses in tertiary institutions in Nigeria?

### **Methodology**

The study adopted a descriptive survey research design with a study population which consisted of all the female students enrolled in science based courses in the tertiary institutions in Nigeria at the time of the study. The sample size for the study was one hundred and sixty-one (161). A two-staged sampling procedure was adopted which

included the use of the simple random sampling technique at the first stage to select ten institutions .and systematic random sampling technique at the second stage to get a sample of 161 students from the sampling frame of students in each institution. The instrument for data collection in the study was a structured questionnaire with a reliability coefficient of 0.70. Data was collected from female students pursuing Science-based courses. The data was collected by the researcher with the help of one research assistant. Data was analyzed using descriptive statistics such as percentage and mean while inferential statistics such as Chi-square was used at 0.05 level of significance.

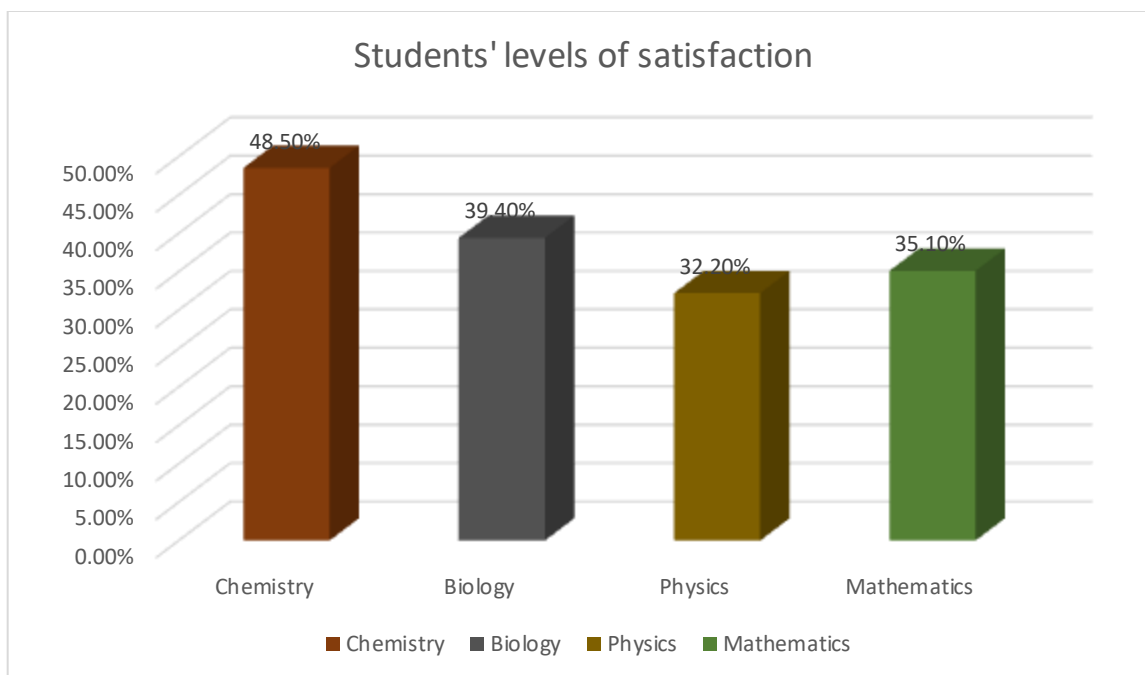
## Results

The results of this study are presented below in Figures and Tables:

**Table 1: Performance of female students in the past Science subjects in JAMB relative to their expected performance**

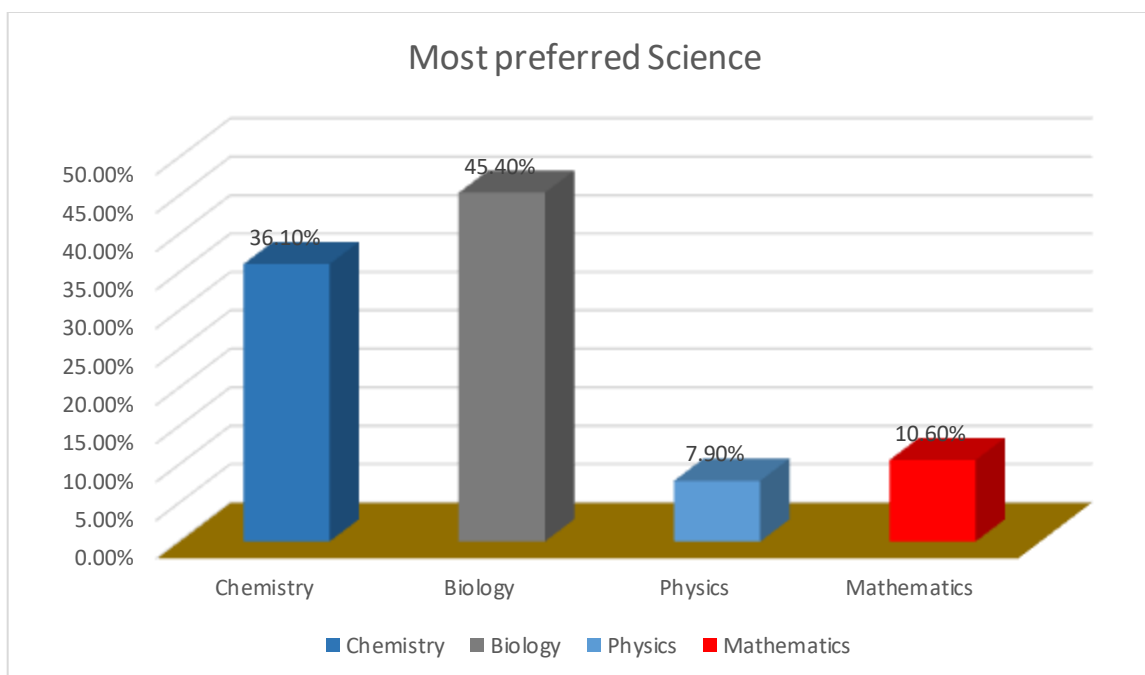
	Chemistry		Biology		Physics		Mathematics	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
<b>A</b>	0.0	22.5	0.0	13.8	0.0	10.9	0.0	8.0
<b>B</b>	1.4	49.3	1.4	39.1	2.9	39.1	1.4	17.4
<b>C</b>	70.3	15.2	64.5	31.9	37.0	28.3	39.1	58.0
<b>D</b>	23.2	13.0	31.9	15.2	47.8	21.0	39.1	16.7
<b>E</b>	5.1	0.0	2.2	0.0	12.3	0.7	20.3	0.0

Table 1 showed the overall performance of female students in Science subjects in relation to the expected performance in the different subjects in JAMB. The figure indicated that most of the students score C in Chemistry (68%) and Biology (63%) and grade D in Physics (50%), equal number of students scored grade C and D (40%) in Mathematics. On the other hand majority of the students expected to score grade B in Chemistry (50%), Biology (40%) and Physics (37%) while most of the students expected a score of C in Mathematics. When the differences in the score of students in Science subjects was subjected to statistical chi-square test, there was a significant relationship between the actual scores and the expected scores ( $\chi^2 = 19.874$ ,  $df = 3$ ,  $p = 0.0001$ ). The overall trend was that most students scored lower grades in Science subjects than expected.



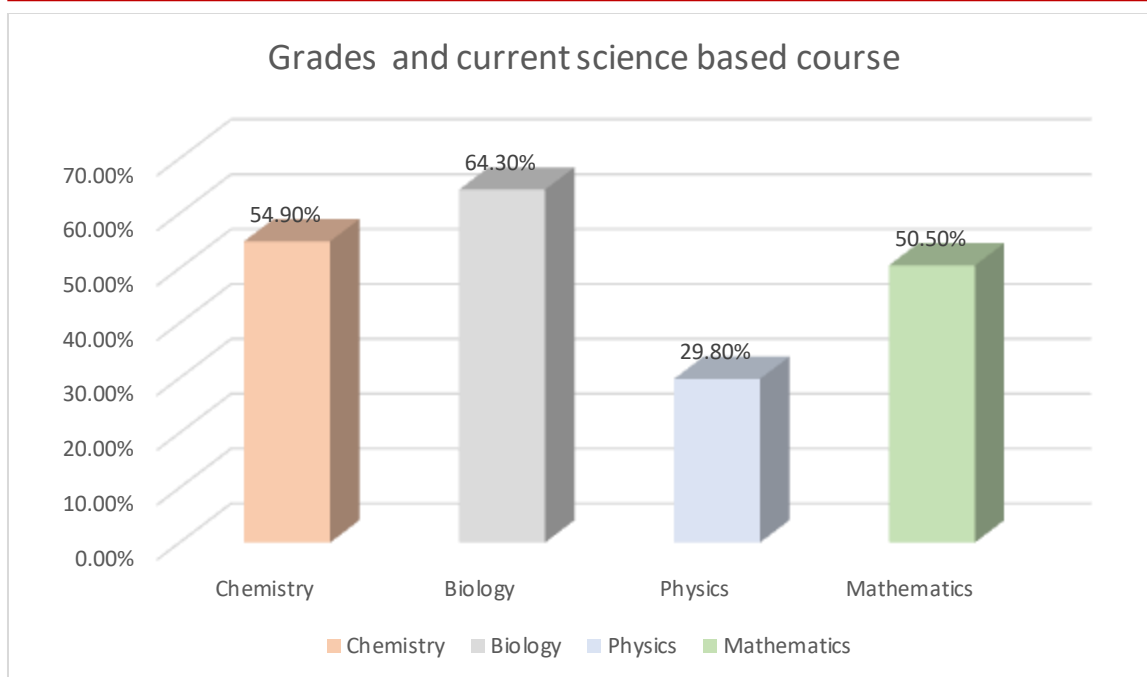
**Fig 1: Bar chart showing students' level of satisfaction in their performance in core science subjects**

The result showed that, students' level of satisfaction was highest for Chemistry (48%) followed by Biology (40%) and least for Physics (35%).



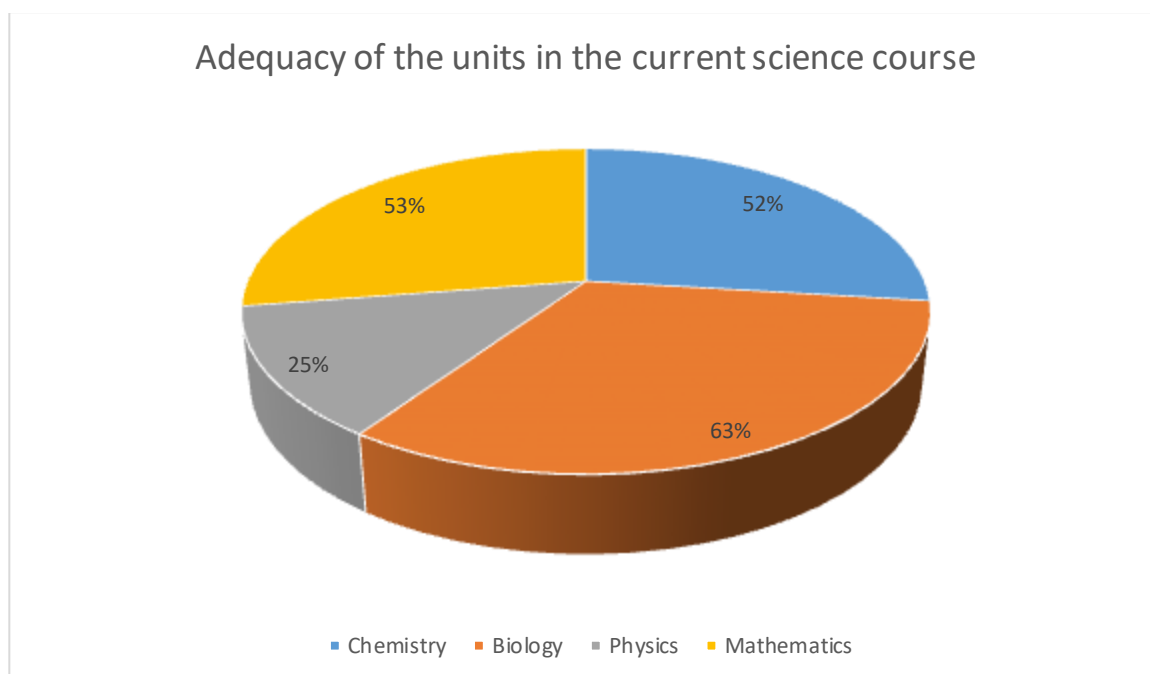
**Fig 2: Most preferred Science subjects by the students**

Based on the figure, Biology was the most preferred subject by 45% of the students followed by Chemistry by 36.1% of the students and Mathematics and Physics were the least preferred at 11% and 8% respectively,



**Fig 3: Bar chart showing students grades and current science based course at the institution**

The students were also asked if their grade in any of the science subjects resulted in their current enrolment in Science based course at the institution. Based on the table 4.4, 65% of the students attested that their current grades in Biology resulted in their current enrolment in Biology based subjects. On the contrary only 30% of the students indicated that their enrolment in Physics was related to their performance in the subject.



**Fig 4: Pie chart showing adequacy of the units in the current Science course**

The adequacy of the units in the current Science course was also determined (Fig 4). Based on the responses of the students, majority of the student felt that their performance in Science subjects was inadequate the most being for Biology (63%),

followed by Chemistry (52%) and least in Physics (25%).

**Table 2: Effects of the school-based factors on enrolment in Science based courses among female Science based courses students**

Factors	Response	Frequency	Percent frequency	Probability to complete
Good school management	Yes	65	47.8	87
	No	71	52.2	13
Good facilities	Yes	53	39.0	67
	No	83	61.0	33
Good learning environment	Yes	79	58.1	81
	No	57	41.9	19
Good students discipline	Yes	96	70.6	61
	No	40	29.4	39
Good boarding facilities	Yes	44	32.4	62
	No	92	67.6	38
Proper classrooms/lecture halls	Yes	51	37.5	45
	No	85	62.5	55
Adequate classrooms/lecture halls	Yes	24	17.6	49
	No	112	82.4	51
Attractive buildings	Yes	89	65.4	21
	No	47	34.6	79
Good meals	Yes	21	15.4	32
	No	115	84.6	68
Good neighboring communities	Yes	102	75.0	32
	No	34	25.0	68
School staff is professional	Yes	97	71.3	74
	No	39	28.7	26

The female students were asked if they had fees problem, and whether they were always send home due to school fees. 85% of the female students stated that they had fees problems and 60% reported being send home for school fees. Furthermore, over 70% of the female students stated that this is one of the main reasons leading to them dropping out of schools. Facilities in the institutions were also assessed by the researcher who inquired if the student had good facilities in the school. However only 31% attested that there were good facilities for learning. Based on the table, majority of the students believed that the there were poor management by the institution, poor facilities, poor lecture rooms, poor buildings, poor meals but still approved the good learning environment, good students discipline, good neighbourliness and professional staff. For all the positive response, the students showed propensity to complete their courses.

### Discussion of Findings

The problem arising from negative perception of the Science based Course fraternity stems from the perception that past performance covered in the tertiary institutions differs substantially with the practical requirement for effective Science based Course practices. In order to perform well in a course, the learner needs to be interested and understand the concepts that are dealing with (Kroft *et al.*, 2006). First, the female students were asked why

they preferred to study Science based courses at the tertiary institutions. The results indicated that many female students opted for Science based courses since they liked the course (82.1%), others enjoyed the prospect of being in a Science based courses (90.0%) while the highest number of students in Science based Course (98.0%) decided to take the course because they believed that it was prestigious. Lower percentage nevertheless opted for the Science based Course because they passed their exams (35.2%) and persuasion from the parents (44.2%). On the contrary, lower proportion of day student chose Science based Course because of: lack of alternatives (2.0%), peer pressure (3.1%) as well as a bridge to further pursue other courses (5.8%).

It was therefore imperative to note that indeed day students of Science based courses were satisfied with the syllabus content, albeit fewer numbers of day students believed that the content coverage was adequate and thus this puts the burden of ensuring high quality syllabus coverage in the hands of the head of Science Department. As a result of the better and efficient methods of teaching, students are often expected to perform better once in the practical field (Kinutliia, 2009; Achote, 2009), yet because sometimes most of these institutions lack necessary tools and equipment or less emphasis being laid on the practical requirement of the students, performance in the field condition is often much uncertain.

It was also established that facilities were not adequate to handle the practical requirements of the Science based Course adequately and comprehensively. Therefore the researcher established reasons why the department at the tertiary institutions lacks such facilities. The reason cited for lack of these facilities was attributed to high costs of the equipment. However, high maintenance cost and poor management rules such as procurements were blamed on the lack of these equipment. However, most of the lecturers were able to use the machines. There was a perception among the lecturers that the theoretical content was adequately covered by both tertiary institutions while practical content was emphasized in only few tertiary institutions in agreement with Kraak (2007).

The finding of the study showed that, about 72% stated that they need additional training to gain competence in the industrial job market, which stems from negative perception about their roles in enhancing outputs from their firms. Probably one of the most significant areas which continue to affect the quality of teaching at the tertiary level colleges is the remunerations. Normally adequacies of the salaries for most people in the workforce are compared with others in similar fields elsewhere. In this study comparisons of the salaries were made against lecturers' salaries in developed and other African countries. It was surprising, yet anticipated that the salaries provided to the Nigerian lecturers were only 10% those in USA and most European countries and a half of what is being paid in other African countries such as Egypt, Mauritius, and South Africa, which all have better performing Science based Course fraternity than Nigeria (Obot, 2007). Perhaps the main reasons for the brain drain from the Science based Course sector can be traced to the low remunerations. According to Morrison et al. (2006), lowly motivated lecturers cannot teach and will look for other additional source of extra income, which will eventually compromise their outputs. When salaries are low, they cannot meet the lecturers' needs and thus affect their content outputs to the students of Science based Course. To meet the shortfall in the gap between pay and work, they undertake some odd jobs, some of which have little bearing to their teaching at the tertiary institutions.

All Science based courses sampled students believed that they have indeed adequately trained to handle the challenges of the industrial job market. Probably it is a time to examine reasons why the students chose Science based courses because, some chose the course for which they had little, knowledge about as summarized in Table 4.6. Because of the haphazard nature of choosing the course and sometimes inadequate syllabus contents coverage, most students who had never had any opportunity to work in an industrial firm,



hopefully believed that they could handle the training in the job market based on their training in Science based Course.

### **Conclusion**

There were institutional challenges that affected the local tertiary institutions including poor management, lack of basic facilities and generally poor working environment. It was concluded from the result that, the institutional factors influencing female students' performance in science based courses were poor facilities, poor lecture rooms, poor buildings, poor meals but still approved the good learning environment, good students discipline, good neighbourliness and professional staff.

### **Recommendations for policy decision**

Based on the foregoing discussion of the findings and conclusion, the following recommendations were made:

- > The government of Nigeria should establish a clear outline aimed at regulating the learning resources for Science based courses at the tertiary institutions. This will enable the tertiary institutions to have appropriate and standard resources for the teaching of the programmes.
- > The government should set aside a given percentage of the funds to each tertiary level college through the Ministry of Higher Education to facilitate the implementation of the practical training programme.
- > The government should provide resources that will eliminate various problems constraining the effective implementation of the practical programmes in the tertiary institutions. They should strengthen the overall capacity of the training institutions to train people on implementation of the overall Science based Course programmes.
- > The tertiary institutions should have a capacity to develop their own Science based Course training firms that has competent authorities to run them so that they can provide practical orientation to the students in Science based courses fields.