

Assessment of Difference in Enrolment, Graduation and Performance in Physics by Gender in Colleges of Education in Nasarawa State, Nigeria

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Abstract

This study investigated gender difference in enrolment, graduation and academic performance in Colleges of Education in Nasarawa State, Nigeria. The study made use of Ex-post factor research design since it sought to find out the effects of what had already happened. Two Colleges of Education were randomly selected for the study. The total number of students that enrolled and graduated from the two selected colleges of Education within four academic sessions (i.e. enrolment 2012-2015; graduation, 2015-2018) constituted the target population of the study. The data used for this study were obtained from the examination and academic records office of the selected colleges. The data collected were analyzed using frequency count and percentages. The result showed that males are more than females in enrolment and graduation in the two selected colleges. It also revealed that males graduated with better grades than their female counterparts within the selected colleges. Based on the finding in this study, some recommendations were suggested at the end of the study.

Keywords: Gender, enrolment, graduation and performance.

Introduction

This study aimed at addressing the broad issue of enrolment, graduation and academic performance among males and females in colleges of education. Colleges of Education was used for this study because their years of graduation is the same all over, in Nigeria, {that is, Nigeria Certificate in Education [NCE] program is normally billed for three years}. The study was motivated by the findings of researchers and the historical poor enrolment and performance of students in sciences especially physics, and also the historical underrepresentation and participation of females in the domain of science and science related courses, particularly in Nigeria. Education is perceived as “instrument per excellence for effective National development”, and the teacher is the fulcrum on which the entire education enterprise revolves. The essence of teaching is to bring about a positive change in the behavior, attitude and thinking of the learner. However, for curriculum changes to be successful, professional development among teachers must be considered alongside appropriate strategies (Orodho, 1996)

The teacher is one of the important variables whose function can enhance the realization of educational goals. If teachers are deficient in various contents they teach, the quality of learning and performance will be very poor at all levels of education. Hence, the investigating of enrolment, graduation and academic performance of pre-teachers in Colleges of Education is expedient. As the Nigerian society is evolving, the need of qualified teachers is ever expanding. Consequently, there is growing pressure on the teacher education programs to provide the required teachers in quality and quantity. While the demand for qualified teachers is ever increasing, the enrolments into teacher education programs have continued to dwindle. Sharehu (2009) expressed fear concerning the dwindling rate of enrolment into the National

Teachers' Institute Kaduna teacher training programs. The development posed a serious challenge to the production of quality teachers for the nation's school system and the institute's continued existence. This problem is a worldwide issue, Freedberg [2013] reported the same scenario in California, USA, where enrolment into teacher preparation programs in California is continuing to decline at a precipitous rate. A report from California commission on teacher credentialing indicates that 26,446 students were enrolled in teacher preparation programs in 2011 – 2012, a 24% reduction from the previous year's total of 38,838 students. The declining enrolments are echoed by similarly declining numbers of teaching credentials. Education can be seen as a process to attain acculturation through which the individual is helped to attain development of his or her potentialities so as to achieve perfect self-fulfilment. It can be viewed as the cultivation of whole person which involves intellectual, affective, character and psychomotor development. This involves human resources development and constitutes the ultimate basis for wealth of Nation.

One of the major challenges of science education in Africa, mostly in Nigeria is the problem of gender disparity. There is a particular history that presented sciences as males' subjects and the females were not encouraged to take science courses. Gender difference in science, [especially physics] participation and academic performance have received much attention in science education literature. There appears, however, contradicting, conflicting and inconclusive views especially with regards to performance. On gender enrolment, Dawson [2000] reported that females are less interested in the physical sciences than their male counterparts, and that females' enrolment in sciences drops as they get to higher school physics stage. Ahmed [2001] pointed out that, there is low participation of females in sciences, Technology and Vocational education because these areas are exclusively meant for male. Bakari [2001] stressed that, retention and achievement within educational system of female students is affected by lack of interest of uneducated parents on female education.

Many developing countries including Nigeria have realized what developed countries have benefited and are still benefiting from science and technology, i.e. science education in general term. Based on this, Nigeria has lifted her hand in making science education a tool for national development. Nigeria being a developing country require scientists [both male and female] to develop scientifically. But such educational goal cannot be achieved if there should be a gender difference [bias] in enrolment, graduation and performance among students in science courses. Nigeria realizing that she cannot grow as she wanted without creating qualitatively scientific and technological man power, therefore determines to make education an instrument per excellence for the development of the nation in terms of science and technology. This then calls for urgent attention to science, and the need for students' positive attitudes towards sciences especially physics. Females generally are said to be poor in terms of their performance and are very few equally in sciences, especially physics. The paucity of females in science and worst in technology is a well-documented fact, the truth is that in the past, and to a large extent in the present, it was assumed that if science was to be done, it should be done by the males while the females are to be contented with liberal arts and humanities. It is very important to encourage females to study science and technology so that they may have access to profession which demands scientific and technological background. For a country to develop progressively and rapidly, there must be an involvement of both sexes in the field of science and technology. Brinosho [1994] reported that, "for development to proceed equitably, all section of the society must be involved in the choice of science and technology, all must be aware of its limitations and enjoy its benefits". Okafor [2004] observed that, there are more men in civil and other technological courses than women.

Physics is perceived to be a difficult course due to its abstract nature, and as a result of this, students perform poorly in it, at all levels of educational system. Lack of interest in physics by students can be due to perceived idea that physics is a difficult subject, and this has affected the enrolment and performance of students in physics [Bamidele, 2004]. This poor performance in physics is not gender exception, it cut across both male and female, but it is very important to find out the level of failure between male and female so as to proffer adequate solution to it.

This study is necessary because of gender disparity in science enrolment and also in job placement in Nigeria. Abdullahi, et.al, [2007] agreed that socialization patterns in Nigeria and most African setting, place enormous restriction on the female gender and demand from her a higher input of daily domestic labour than from male. This perception automatically scheme female out from any consideration for serious professional discipline even in cases where the female appears to be more brilliant than their male counterpart. Mari [2005] believed that gender discrimination in employment is one of the factors contributing to gender inequality in pursuit of science, technology and mathematics education; many employers of labour, females inclusive prefer employing male than female. This is an obvious truth, especially when it has to do with married females. It is very necessary to compare students' performance in physics based on gender to know if males' performance in physics is better than that of females which may result into having more males in physics enrolment than females or make males to be more in any job relating to physics.

It is also believed that males performed better than females in any course that deal with calculations. Awoniyi [2000] observed that male candidates performed better than females in subject requiring quantitative differences. Based on these, therefore, the gender difference in enrolment, graduation and performance in physics at all levels of education is worth investigation, and proper recommendations given should be adhered to strictly in order to enhance mostly females' high representation, participation and better performance in science, particularly physics at all levels of education.

Statement of the Problem

Gender difference in science education participations are already visible in early childhood care and education in science and mathematics related play, and becomes more pronounced at higher levels of education, girls appears to lose interest in science subjects with age particularly between early and late adolescence, this decreased interest affects participation in advanced studies in higher education [UNESCO,2017]. It has been argued that students' poor performance in physics is on the increase rate. Akanbi [2003] observed that the trend in the enrolment and performance of students in science subjects, especially physics assumed threatening and frightening dimension. Dawson [2000] stressed that females' enrolment in physical sciences drops as they get to higher school physics stage. It is a matter of regret that despite the utility value of physics and its involvement in the science related courses that give prominence to a nation, students' performance in physics at all levels of education remains at a very low state. Therefore, gender difference in enrolment, graduation and academic performance in physics among College of Education students is worth investigation. Thus, does gender difference has any effect on students' enrolment, graduation and performance in physics in Colleges of Education in Nasarawa State, Nigeria.

Purpose of the Study

The study aimed at the investigation of gender difference in enrolment, graduation and performance in physics among Colleges of Education students in Nasarawa State. The purpose of this study specifically is to determine the following:

1. the difference in enrolment, in physics program by gender in Colleges of education in Nasarawa State, Nigeria.
2. the difference in graduation rate, in physics program by gender in Colleges of Education in Nasarawa State, Nigeria.
3. the difference in academic performance in physics by gender in Colleges of Education in Nasarawa State, Nigeria.

Research Questions:

The study was guided by the following research questions:

- 1]. What is the difference in enrolment, in physics program by gender in Colleges of Education in Nasarawa State, Nigeria?
- 2]. What is the difference in graduation rate in physics program by gender in Colleges of Education in Nasarawa State, Nigeria?
- 3]. What is the difference in academic performance in physics by gender in Colleges of Education in Nasarawa State, Nigeria?

Methodology

The study adopted the ex-post facto research design, this is because it sought to find out the effect or result of what had already happened/occurred and moreover, the variables under study cannot be manipulated. Two Colleges of Education were randomly selected within Nasarawa State. The total number of students that enrolled and graduated from physics program within four [4] academic sessions [i.e. enrolment 2012 – 2015 and graduation 2015 – 2018], from the two selected Colleges of Education, constituted the target population of the study. The data used for this study was collected from the examination and records office of the two selected colleges, and are so reliable. The data collected were analyzed using frequency count and percentages. The colleges grading system at graduation which is a standard all over the Colleges of Education in Nigeria is shown below.

Range of G.P. A	Letter Grades	Remarks
0.00 – 0.99	F	Fail
1.00 – 1.49	E	Pass
1.50 – 2.49	D	Pass
2.50 – 3.49	C	Merit
3.50 – 4.49	B	Credit
4.50 – 5.00	A	Distinction

Result

Research Question 1: What is the Gender difference in enrolment into physics program among students in Collages of Education in Nasarawa State?

Table 1: Gender Difference in Enrolment into Physics program Among Students in Colleges of Education in Nasarawa State.

Gender/Year	2012		2013		2014		2015	
	Freq	Pec[%]	Freq	Pec[%]	Freq	Pec[%]	Freq	Pec[%]
Males	117	80.1	101	82.8	156	78	81	69.8
Females	29	19.9	21	17.2	44	22	35	30.2
Total	146	100	122	100	200	100	116	100

From Table 1 above, the total number of male students enrolled into physics program in the year 2012 is 117[80.1%] while females were only 29[19.9%] in number, just about one quarter of males. In the year 2013, males were 101[82.8%] while females were only 21[17.2%], about one fifth of males. In 2014, the males were 156[78%], while females were only 44[22%], a little above one quarter of males. And in 2015, the males were 81[69.8%], while females were 35[30.2%], a little above one third of males.

Research Question 2: What is the gender difference in graduation in physics program among students in Colleges of Education in Nasarawa State?

Table 2: Gender Difference in Graduation in physics program Among Students in Colleges of Education in Nasarawa State.

Gender/Year	2015		2016		2017		2018	
	Freq	Pec[%]	Freq	Pec[%]	Freq	Pec[%]	Freq	Pec[%]
Males	80	80.0	67	77.0	95	77.9	85	70.2
Females	20	20.0	20	23.0	27	22.1	36	29.8
Total	100	100	87	100	122	100	121	100

From table 2 above the total number of males that graduated from physics program from the two selected colleges of Education in 2015 were 80[80%], while females were only 20[20%], about one quarter of males. In the year 2016, the graduated males were 67[77%], while females were only 20[23%], about one third of males. In 2017, the males that graduated were 95[77.9%], while the females were only 27[22.1%], a little above one third of males. And in 2018, the number of males that graduated were 85[70.2%], while the females were 36[29.8%].

Research Question 3: What is the gender difference in performance in physics among Colleges of Education students in Nasarawa State?

Table 3: Gender Difference in Performance in Physics among College of Education Students in Nasarawa State.

Grades	2015		2016		2017		2018	
	Males	Females	Males	Females	Males	Females	Males	Females
A	-	-	2 [3%]		-	-		
B	8 [10%]	-	4 [6%]	1 [5%]	8 [8.4%]	2 [7.4%]	13 [15.3%]	1 [2.8%]
C	65 [81.2%]	17 [85%]	56 [83.6%]	16 [80%]	66 [69.5%]	16 [59.3%]	53 [62.4%]	32 [88.9%]

D	7 [8.8%]	3 [15%]	5 [7.4%]	3 [15%]	21 [22.1%]	9 [33.3%]	19 [22.3%]	3 [8.3%]
E	-	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-	-

From table 3 above, there was no single **A** in 2015, 10% of males had **B**, 81.2% had **C** and 8.8% had **D**; while 85% of females had **C** and 15% had **D**. In 2016, 3% of males had **A**, 6% had **B**, 83.6% had **C** and 7.4% had **D**, while 5% of females had **B**, 80% had **C**, and 15% had **D**. In 2017, 8.4% of males had **B** 69.5% had **C** and 22.1% had **D** while 7.4% of females had **B** 59.3% had **C** and 33.3% had **D**. In 2018, 15.3% of males had **B**, 62.4% had **C** and 22.3% had **D**, while only 2.8% of females had **B**, 88.9% had **C** and 8.3% had **D**.

Discussion of Findings

From the results above, it is obvious that males enrolled more into physics program in the selected Colleges of Education in Nasarawa State than their female counterparts within the four academic sessions [i.e. from 2012 to 2015]. This is in support with some researchers' findings; Ahmed [2000] stressed that, there is low enrolment of females in Science, Technology and Vocational education because these areas are exclusively meant for men. On the case of graduation, the result also revealed that males graduated more in number than their female counterparts within the four academic sessions used for this study, in the selected Colleges of Education within Nasarawa State. Though, this equally has to do with the number of students that enrolled into the program [physics]. It is an obvious fact that when more is added into, more will be collected back. The fact is that this study did not show any gender difference in graduation, since the more you put, the more you get. This no difference in gender in graduation simply implies that graduation of any of the gender can in no way affect the graduation of the other. This simply implies that there is no difference in gender in graduation and that gender difference has no influence on students' graduation in physics program in Colleges of Education in Nasarawa State.

On the gender difference in performance, the result revealed that males graduated with better grades than their female counterparts, this simply implies that males performed better than females in physics program within the selected Colleges of Education in Nasarawa State. This result confirmed the submission of Awoniyi [2000] that, male candidates performed better, relative to females in subjects requiring quantitative ability, males show superiority in science, statistics and accounting. Belief of many, that women primary role is in the home is not unconnected with their attitude toward learning, which eventually made males to perform better than females in schools as revealed in this study.

This result is not surprising due to females' attitude to things of life, for example, females spend a lot of their time in dressing, make-up, hair plaiting and other things like that. Bakari [2001] stressed that, retention and achievement within education system of female students is affected by lack of interest of uneducated parents on female education. That male students performed better than female students as revealed by this study, can also be attributed to the fact that male students had more time for their studies as against the female students who are always distracted by domestic assignments. Olarewaju [2006] opined that, cultural settings do not encourage the girls to learn science like the boys; boys go out freely to explore and learn outside but girls are kept at home doing domestic work.

Conclusion

Gender difference in science education especially physics education has always been visible. Based on the findings of this study, it can be concluded that;

There is actually low enrolment of students into physics program among the selected Colleges of Education used for this study within the four consecutive academic sessions, and the low enrolment is much more on females; females' enrolment into physics is very poor compared to their male counterparts.

In the case of graduation, male students also graduated more than their female counterparts, in physics program within the four consecutive academic sessions in the selected Colleges of Education used for this study, this is quite understandable because there were more males in enrolment than females. There is gender difference in academic performance of the students within the selected Colleges of Education used for this study. The result showed that males performed higher with better grades than their female counterparts.

Recommendations

Based on the findings and conclusion reached on this study the following recommendation were made

1. , female students need to be encouraged into sciences and science related courses, most especially physics, at all levels and most importantly in Colleges of Education so as to produce qualitative female instructors/teachers, and as such, the following recommendations were suggested:
2. Female students should be given special attention by, mostly the teachers with the aim of making them to be more committed to their work, they should be monitored always to ensure that they do their assignments regularly, partake in group projects and attend practical classes.
3. Automatic employment should be given to any female student who performed very well in physics in Colleges of Education and, or be made to further her education according to her choice.
4. Government as well as individual, and school management should also encourage female students who performed well in physics through the gift of awards and incentives, as well as scholarship.

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