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APPRAISAL OF ACADEMIC PERFORMANCE OF MALE AND FEMALE SCIENCE – BASED GRADUATES ADMITTED THROUGH UTME ONLY AND UTME/POST-UTME IN NNAMDI AZIKIWE UNIVERSITY, AWKA

Marycynthia C. Obineche[1] & Akal-Karali Jame Obineche[2]
[1]Department of Educational Foundations, Nnamdi Azikiwe University Awka
[2]Department of Technology and Voctional Education, Nnamdi Azikiwe University Awka

Abstract
The cardinal focus of this study is to examine the impact of modes of admission (UTME and Post-UTME) on academic performance of male and female in science related disciplines in Nnamdi Azikiwe University, Awka. It was an ex-post facto research design. Three research questions and three null hypotheses guided the study. The study covered eight academic sessions, four years before the introduction of Post-UTME from 2001 – 2005 and four years after the introduction of Post-UTME from 2005 – 2009. The population of the study was 35,308. The sample was 1928 drawn from the department following the admission and registration lists of those who were admitted through UTME only and those admitted through UTME / Post-UTME respectively. Two instruments were used for data collection, which included Admission list and student's academic records. Mean statistics was used to analyze the research question while the null hypothesis was tested using z-test at 0.05 level of significance. The finding revealed the following; the academic performance of male science graduates was higher than the female sciences graduates admitted either from the two modes of entry. Based on the finding the study recommended among others that; equal representation of both genders should be ensured during admission especially in sciences related disciplines. Also post –UTME should be reinstated as a functional screening exercise for admission into Nigerian universities.
Keywords: Education, Academic Performance, FCGPA, UTME, POST-UTME, Gender, Science discipline

Introduction

Highly developed human capital is a product of high quality education. Education in its sense gives one the opportunity to become a productive member of a civilized society. it expands ones horizons, vision and creates awareness for possible innovations. Education is a gateway into achieving ones micro and macro dreams and aspirations (https:www.scribd.com). In formal educational institutions success is measured by appraising the academic performance of students based on the standard set by Ministry of Education. In this context students academic performance were appraised with male and female students performance in science discipline as it relate to mode of entry in Nigerian University Education namely UME which is now known as Unified Tertiary Matriculation Examination (UTME) and Post-Unified Tertiary Matriculation Examination (Post-UTME) in order to compare and contrast which admission procedure produces better academic performance of male and female graduates in science related disciplines.

Academic Performance is a yardstick for check. Allen (2004) described student academic performance as a standard in which existing programme can be assessed to determine the efficacy of the programme to individual learner. In essence, academic performance is

actually a standard parameter for ascertaining the capabilities of a student from which their potential could be inferred. It is inevitable in any formal educational institution. Hence, we define academic performance as standard yardstick for ascertaining learners' level of studiousness to academic activities which reflect in their ability to solve academic tasks. Arasian (2005) viewed that academic performance is usually measured in examination or through continuous assessment tests and could be used to determine students' FCGPA depending on assessor's reasons.

(FCGPA) final cumulative grade point average has been one of several major factors used by colleges, universities and employers to appraise students' overall academic performance. In Azikiwe University, Awka the FCGPA is graded as follows first class (1st class) 4.5 and above, second class upper division (two-one) 3.5 to 4.49, second class lower division (two-two) 2.40 to 3.49, third class (3rd class) 1.50 to 2.39, pass 1.0 to 1.49 and fail below 1.0. It is obtained by adding all the grade point average (GPA) obtained by the student from the first year to the final year. The GPA is a better measurement because it provides a greater insight into the relative level of performance of students which determines the quality of graduates in an institution of learning (IGI, Global n.d).

Obviously, academic performance as it relates to modes of admission has attracted the attention of many researchers. Olajide, Okewole and Agboola (2015) reported that contrary to expectation that all students admitted into the university irrespective of the mode of entry would be able to cope with the academic rigors though some students drop out on the way without graduating from the university. Also many students change their courses while others spend extra years before graduating; and more often some students end up with third class or adversely with low Cumulative Grade Point Average (CGPA) from many universities in Nigeria thereby compounding their chances of gainful employment. According to them, the belief of people over which mode of entry is better in terms of university academic achievement of student is different from one author to another. Hence, there have been conflicting findings on the predictive strength of modes of entry in forecasting students' academic performance in university examinations. .

However the study by Hanson (2000) indicated that student's academic performance can also be determined by different conditions other than academic environment, race, learning abilities such as modes of entry, gender and choice of disciplines among others. Disciplines as it relates to modes of entry, gender and academic performance are areas of interest in this study. Science-based disciplines which houses both Applied Biochemistry and Computer science courses among others will be analyzed on the basis of student's academic performance of graduate admitted with UTME only and students admitted with both UTME and post-UTME in Nnamdi Azikiwe University, Awka. Hence the study was a comparative assessment of male and female graduates admitted through UTME only and UTME/post-UTME in Science based disciplines in the university, their academic performance were subjected to comparison in relation to gender visibility of Science-based disciplines. Basically, in order to ascertain the entry mode that produces graduates with better academic performance.

The word Science is the systematic study of anything that can be examined, tested and verified. Science is a branch of knowledge or study dealing with a body of facts or truth systematically arranged and showing the operation of general laws. It is systematic knowledge of the physical or material world gained through observation experimentation(https//blogs sciencemag.org.>ten-i…….)Some of the faculties/department under science based disciplines includes; Industrial chemistry, Biochemistry, Science Laboratory Technology, Engineering,

Pharmacy ,Computer Science, Industrial physics, Microbiology, Medicine & surgery and Pure & Applied Mathematics among others(https://www.legit.ng>1106639.

Moreso, the study by Hanson (2000) also indicated that gender is one of those factors that determine student's academic performance. Gender issue as it relates to academic performance has become the talk of today's education forum. Arthur, Sam, Osei and Kattah (2019), opined that gender has been found to influence the academic performance of male and female students and has in turn called the attention of institutions of higher learning, governments and individuals in recent times, to investigate the extent to which gender determines academic performance. Gender according to Lahey (2003) is a psychological experience of being male or female. It is one of such factor that has considerable effects on student's academic performance especially in science courses. In consonance, Arighabu and Mji (2004) observed that gender bias is still very prevalent particularly in science related disciplines than any other discipline. Calsmith (2007) explained that the influence of gender and its difference in academic performance is a complex task, thus many studies appear to be contradictory. Maceoby (2003) pointed out that girls are more confirming, suggestible and dependent on the opinions of others. The traits in turn have been related to dependency in the ability to break a set of tasks. Maceoby then suggested that these same traits in female might also account for their superior performance on tasks involving analytic thinking, spatial and abilities.

It is however, interesting that empirical results on this issue have not been consistent in relation to modes of entry and performance in their chosen disciplines. The decision in this discourse are inconclusive as some research has shown that academic performance is related to gender, gender and mode of entry significantly affecting level of performance while some research revealed no relationship between gender and academic performance. Some empirical studies such as Mankumari and Ajay (2017), Ghazvini and Khajehpour (2011), Khwaileh and Zaza (2010), Nnamani and Oyibe (2016) revealed that female students outperform their male counterparts in the chosen discipline. Ochonogor (2011) study revealed significant different in academic performance of male and female undergraduates. The results showed that the female students are more in biology discipline as a course and also performed significantly better than the males. This finding was actually in disagreement with Denga (1998) who stated that girls tend to do better than boys in English Language and Music while boys tend to outperform the girls in mathematics and science disciplines courses.

Moreso research findings of Aguele and Uhumaiah (2008); Bamidele, Odusola and Dibu-Oyerinde (2006); Billings (2001); Lawal and Jiya (2012) Okebukola (2002); Kolawole as cited in Dike, Anyanwu, Bitrus, Hadiza and Folashade (2018) found in their separate studies that male students achieved significantly better than female students in different science disciplines. While research findings of Arthur et. al. (2019); Dike et. al. (2018); Goni, Wali, Ati and Bularafa (2015); Olasehinde and Olatoye (2014); Omirin (2007) in their own individual studies revealed that there were no significant difference in academic performance between male and female students in their various science disciplines courses. Kelly cited in Emaikwu (2012, p.154) asserted that boys are ahead of girls in every branch of science with the largest difference being in mathematic. Also Adigun, Onihunwa, Irunokhar, Sada and Adesina (2015) indicated that male students had slightly better performance compared to female students in computer studies, though was not significant.

Modes of admission in relation to gender academic performance are an interest to this study. Research studies such as Abiodun and Adeyemi (2015); Otekunrin, Okon and Olekunrin (2017) in their separate studies revealed that gender and mode of admission significantly affect the level of performance, with male students performing better than female counterpart in their chosen disciplines. Fatade, Nneji, Awofala and Awotala (2012) in their own study indicated significant

effect of modes of entry on student's academic performance. Entrants through direct entry mode consistently showed better performance in degree mathematics and science disciplines than entrants through pre-degree science education mode and entrants through Unified Tertiary Matriculation Examination mode.

Similarly, research study of Kolawole, Oginni and Fayomi (2011) in their own study revealed significant difference in modes of entry, with Post-UTME as best predictor of students' academic performance in chemistry in Nigerian Universities. Taking a contrary stand, Afu and Ukofia (2017) in their own study, revealed that that UTME and post-UTME have no significant difference in the academic performance of 4 department studied namely English Language, Economics, Accounting and Education disciplines. Ajaja (2010) in one of the finding revealed non-significant difference between male and female students admitted through Post-UTME in science discipline courses..

However, the issued concerning gender, modes of entry and students' academic performance in relation to their chosen disciplines have remained inconclusive, hence researchers tends to unresolved matter with divergent findings and opinions. In that vein, this study intended to add to the building block of understanding about gender, modes of entry and students' academic performance in science – based disciplines. Willian (cited in Okafor and Egbon, 2011, P.2) asserted that "researching issues in gender and students' academics is like building a wall. No single study provides the whole wall just one of the bricks". This study, however, wishes to add a solid block to such a multifaceted edifice.

From the foregoing, it revealed that student's academic performance as relates to modes of entry has been an issue of great concern to people who are interests in education industry in Nigeria with the role of gender in student's academic performance still inconclusive. Hence the search for the most desirable mode of selecting candidates for admission into Nigerian Universities continues unabated.

In that vein, the researchers are curious to establish their own finding, based on the issues on discourse. The researchers were also motivated by the assertion made by proponents of Post-UTME exercise which was evident in (Ajaja, 2010. P.31) "that the exercise will only ensure quality and when the best students are admitted, the results will also be enhanced and reflect in the quality of graduates produced by Nigerian Universities". Hence the research seeks to find how far these hold true..

Purpose of the Study

The main purpose of this study was to appraise the academic performance of male and female science-based graduates admitted with UTME only and those admitted with UTME / Post-UTME in Nnamdi Azikiwe University, Awka. Specifically, the study sought to find out:

1. The academic performance of male and female science based graduates admitted either through UTME from 2001 – 2005 and those admitted through UTME / Post-UTME from 2005 – 2009 as depicted in their FCGPA.
2. The academic performance of male science based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively as depicted in their FCGPA.
3. The academic performance of female science based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively as depicted in their FCGPA.

Research Questions

The following research questions guided the study.

1. What are the differences in the academic performance of male and female science based graduates admitted either through UTME from 2001 – 2005 and those admitted through UTME / Post-UTME from 2005 – 2009 respectively ?
2. What are the differences in the academic performance of male science based graduates admitted through UTME from 2001-2005 and those admitted through UTME /post-UTME from 2005-2009 respectively?
3. What are the differences in the academic performance of female science based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively?

Hypotheses

Hypotheses was tested at .05 alpha level

1. There are no significant differences in the academic performance of male and female Science-based graduates admitted either through UTME from 2001 – 2005 and those admitted through UTME / Post-UTME from 2005 – 2009 respectively.
2. There are no significant differences in the academic performance of male Science based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively.
3. There are no significant differences in the academic performance of female Science based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively.

Research Methodology

Study was carried out in Nnamdi Azikiwe University, Awka. The study adopted survey design an ex-post facto type. The population of this study was 35,308. The population consists of all the students admitted and registered in regular programmes from 2001 – 2005 academic sessions through UTME only which amounted to 20,004 and those admitted and registered in regular programmes from 2005 – 2009 academic sessions respectively through UTME / Post-UTME which amounted to 15,304 in Nnamdi Azikiwe University, Awka campus. The study covered eight academic sessions, four years before and four years after the introduction of Post-UTME. The sample size of the study comprised 1928 drawn from science based disciplines following the admission and registration lists of those who were admitted through UTME only and through UTME / Post-UTME respectively. A purposive (judgmental) sampling technique was employed for the study. Two instruments were employed for the purpose of data collection in this study. The instruments are students head count record collected from the office of the Directorate of Academic Planning and Student's Academic Record from the (Registry) Examination Unit, Nnamdi Azikiwe University, Awka.

Instruments were not validated because the two instrument used for data collection were original records and all information collected from them are from the original sources and thus adjudged to be correct, authentic and reliable (Borich, 2004) considering the number of years involved in the study, the researchers solicited the approval of the Registrar, Director of academic planning for the lists of students admitted based on their modes of entry and academic sessions and Deputy-Registrar Examination with the staff of the unit for academic status of the students (CGPA) admitted through UTME only and those admitted through UTME / Post-UTME respectively. The data collected was analyzed using mean to answer research question. The null hypothesis was tested using z-test at 0.05 level of significance.

Results:

The result of the analyses of the data obtained from research questions.

Research Question 1: What are the differences in academic performance of male and female science graduates admitted either through UTME from 2001 – 2005 and those admitted through UTME / Post-UTME from 2005 – 2009?

Table 1: Mean score of Two sample

	Female	Male	Mean Difference
Mean	2.559810606	2.670785714	0.110975108
Known Variance	0.574322165	0.578958422	
Observations	528	980	

Analysis on the Table 1 that the mean CGPA for 528 female science graduates admitted either through UTME only or UTME/Post-UTME was 2.559810606 and that of 980 male science graduates admitted either through UTME only or UTME/Post-UTME is 2.670785714. Therefore, the mean difference in academic performance of female science graduates and male science graduates is 0.11098. Also, the analysis reveals that the mean score of male science graduates admitted is higher than the mean score of female science graduates admitted either from the two modes of entry.

Research Question 2: What are the differences in the academic performance of male science-based graduates admitted through UTME from 2001-2005 and those admitted through UTME /post-UTME from 2005-2009 respectively?

Table 2: Mean score of Two sample

	Male science-based (UTME only)	Male science-based (UTME/PUTME)	Mean Difference
Mean	2.947948718	2.56113798	0.386810738
Known Variance	0.621882541	0.526805826	
Observations	273	703	

The data analysis on Table 2 shows that the mean CGPA for 703 male science-based graduates admitted through UTME only was 2.56113798 and that of 273 male science-based graduates admitted through UTME/post-UTME was 2.947948718. Therefore, the mean difference in academic performance of male science-based graduates of the two modes of entry is 0.386810738. Also the analysis reveal that the mean scores of the male science- based graduates admitted through UTME/post-UTME is also higher than the male science-based graduates admitted through UTME only.

Research Question 3: What are the differences in the academic performance of female science-based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively?

Table 3: Mean score of Two sample

	Female science-based(UTME only)	Female science-based(UTME/PUTME)	Mean Difference
Mean	2.740165746	2.483333333	0.256832413
Known Variance	0.657468306	0.499100775	
Observations	181	345	

Table 3 shows that the CGPA for 345 female Science-based graduates admitted through UTME only is 2.483333333 and that of 181 female Science-based graduates admitted through UTME/post-UTME is 2.740165746. Therefore, the mean difference in academic performance of female Science-based graduates of two modes of entry is 0.256832413. Furthermore, the analysis reveal that the mean score of female Science-based graduates admitted through UTME/post-UTME is also higher than the female Science-based graduates admitted through UTME only.

Hypothesis 1: There are no significant difference in academic performance of male and female science graduates admitted either through UTME from 2001 – 2005 and those admitted through UTME / Post-UTME from 2005 – 2009.

Table 4: z-Test: Two sample for means

	Female	Male
Mean	2.559810606	2.670785714
Known Variance	0.574322165	0.578958422
Observations	528	980
Hypothesised mean difference	0	
Z	-2.708720673	
P(z<=z) one – tail	0.003377159	
Z critical one – tail	1.644853627	
P(z<=z) two – tail	0.006754318	
Z critical two tail	1.959963985	

The analysis on table reveals significant difference in academic performance, given that z calculated is -2.708720673 while z critical is 1.959963985 at 0.05 level of significance. Therefore, the null hypothesis is rejected thus, there are significant difference in academic performance of male and female science graduates admitted either through UTME only from

2001 – 2005 or those admitted through UTME / Post-UTME from 2005 – 2009 respectively. This implies that the difference in the mean score of male science graduates and female science graduates is significant.

Hypothesis 2: There are no significant differences in the academic performance of male science-based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively.

Table 5: z-Test: of Two Sample for Means

	CGPA (Sci Male 2001 to 2004)	CGPA (Sci Male 2005 to 2008)
Mean	2.558561254	2.94875
Known Variance	0.527552	0.621883
Observations	702	272
Hypothesized Mean Difference	0	
Z	-7.079340188	
P(Z<=z) one-tail	7.24E-13	
z Critical one-tail	1.644853627	
P(Z<=z) two-tail	1.45E-12	
z Critical two-tail	1.959963985	

The analysis on table 2 reveal significant difference in academic performance, given that the Z calculated is -7.079340188 while Z critical is 1.959963985 at 0.05 level of significance. Therefore, the null hypothesis was rejected thus, there are significant difference in academic performance male science graduates admitted through UTME only from 2001-2005 and those male Science graduates admitted through UTME/post-UTME from 2005-2009. This implies that the difference in the mean score of male Science graduates admitted with UTME only and male Science graduates with UTME/post-UTME is significant.

Hypothesis 3: There are no significant differences in the academic performance of female science based graduates admitted through UTME from 2001-2005 and those admitted through UTME/post-UTME from 2005-2009 respectively.

Table 6. z-Test of Two Sample for Means

	CGPA (Sci Female 2001 to 2004) UTME only	CGPA (Sci Female 2005 to 2008) UTME/PUTME
Mean	2.482005814	2.708548387
Known Variance	0.499798	0.663783
Observations	344	186
Hypothesized Mean Difference	0	
Z	-3.196889351	

P(Z<=z) one-tail	0.000694591
z Critical one-tail	1.644853627
P(Z<=z) two-tail	0.001389182
z Critical two-tail	1.959963985

The analysis on table 3 reveal significant difference in academic performance, given that Z calculated is -3.196889351 while Z critical is 1.959963985 at 0.05 level of significance. Therefore, the null hypothesis is rejected thus, there are significant difference in academic performance of female Science graduates admitted through UTME only from 2001-2005 and those female Science graduates admitted through UTME/post-UTME from 2005-2009. This implies that the difference in the mean score of female Science graduates admitted with UTME only and female Science graduates admitted with UTME/post-UTME is significant.

Discussion of Findings:

The finding shows that male science-based disciplines graduates admitted either through UTME only from 2001 – 2005 or through UTME / Post-UTME from 2005 – 2009 performed better than the female counterpart admitted either through UTME only or through UTME / Post-UTME. The study revealed that there were significant differences in the mean performance scores of male science graduates compared to female science graduates. From observation, there was decline in female Science enrollment in tune of 528 as against male Science of 980 students. This might likely gave them the opportunity to out-smart their female counterpart with lower enrollment in science disciplines courses.

The second research question revealed that the male Science-based graduates admitted through UTME/post-UTME from 2005-2009 performed better than the male Science-based graduates admitted through UTME only from 2001-2004 respectively.

The third research question revealed that the female Science-based graduates admitted through UTME/post-UTME from 2005-2009 performed better than the female Science-based graduates admitted through UTME only from 2001-2004 respectively. Consistent with the present finding was the research studies of studies of Aguele and Uhumaiah: Billing; Lawal and Jiya; Odusola and Oyerinde; Okebukola; Kolawale, cited in Dike et. al. (2018, p.68) as well as Denga (1998) found in their separate studies that male students achieved significantly better than female students. Similarly, studies that such as Kelly cited in Emaikwu (2012, p.154 asserted that boys are ahead of girls, in every branch of science with the largest difference being in Mathematics. Similarly, researchers such as Abiodun and Adeyemi (2015); Fatade et al. (2017) in their individual studies revealed gender and mode of admission significantly affect the level of performance, with male students performing better than female counterpart in their chosen disciplines. Buttressing the present finding was research finding of Kolawole et al. (2011) in their own study revealed significant differences in modes of entry with Post-UTME as best predictor of students' academic performance in science related disciplines in Nigerian Universities.

Furthermore, conflicting studies was research finding such as Arthur et al. (2019); Dike et al. (2018); Goni et al. (2015); Olasehinde and Olatoye (2014); Omirin (2007) in their separate studies revealed that there was no significant difference in academic performance between male and female students in the various science disciplines, while Adigun et al. (2015) indicated that male students had slightly better performance compared to the female students in computer studies, though was not significant.

Conclusion

It is evident from the finding that the male science graduates performed higher than the female science graduates admitted either from UTME only or UTME / Post-UTME respectively. Also, male and female graduates admitted through UTME/post-UTME in Science-based disciplines performed better than male and female admitted through UTME only.

Recommendations

The following recommendations were made;

1. Federal government should reinstate post-UTME back to Nigeria universities as a functional screening exercise and not a ghost exercise fashioned to make internal generated revenue (IGR) but for its obvious reason of producing graduates with better academic performance.
2. Equal representation of both genders should be ensured during admission especially in science related disciplines.
3. Female child should be encouraged both by parents, counselors and school authorities to make career choice in science related disciplines.
4. JAMB should continue to conduct external examination for all Nigerian universities while individual universities should be legally allowed to administer internal (Post/UTME) examination for obvious reason of producing graduates with better academic performance.

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