GENDER AND ACADEMIC PERFORMANCES

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ABSTRACT: *Academic performances of male and female students were compared using grades obtained the various levels. The student t-test and Regression analysis were used. The result shows that: The female students score high in the upper grades A's, B's and C's while the Male student have more of D's, E's and F's. Both Male and Female students are putting in more efforts over the years in increasing the number of A's and B's they obtain. There is a reduction the number of C's, D's and F's. On the number of E's, the female students are decreasing the number they get so as to bring up their FCGPA, whereas the male students are increasing theirs thereby decreasing their FCGPA. The rate of improvement over the years is faster for the female students than the male students. The female students have a higher FCGPA than the male students. Female students perform better than their male counterparts*

KEYWORDS: Gender, Academic Performance, Regression, Scores, Final Cumulative Grade Point (FCGP).

INTRODUCTION

In Nigeria today as in other countries of the world, education is expected to play a very vital role in the life of an individuals. It is to provide opportunities for the development of the potentials of the individual member of the community to enable them contribute towards the development of the nation and to be useful to themselves. Nigeria educational structure was categorized into 6:3:3:4 system, which comprises 6 years of primary, 3 years of junior/ 3 years of senior secondary and 4 years of tertiary institute. This structure was recently changed to 9:3:4, by merging primary and junior secondary together. It is on this last stage which university is an integral part that this research work focused on. The grades an individual obtains at the end of his or her career programme depends on the accumulated performances over the years. On the other hand, performance can be defined as the notable action or achievement. It is a word that describes starting of events, extra-ordinary that for any person to perform excellently in academics, the person must be naturally endowed, be determined and also make concerted effort to improving his/her lot.

Gender equality has been a major issue of discussion over the years since most educated women now claim that they are being marginalized. A lot of scholars have studied gender related issue and some are of the opinion that "what a man can do, a woman can even do better" There are various characteristics attributed to men and those attributed to women by God. But more importantly there are some which are not attributed to either man or woman. They are based on the survival of the fittest; the stronger claim its place. One of such attribute is academic performance. There is no where it is written by God that men should be more intelligent than women but the men folk over the years have claimed to be more intelligent, more brilliant, superior etc than their female counterpart. It is therefore against this background that a critical

look at gender and academic performance with special reference to university education is of great importance.

LITERATURE

In the works of Nwosu (2006), academic performances of two groups of students in Mathematics, Physics, and Chemistry with one group offering Further Mathematics were compared. She found out that those who offer Further Mathematics perform better in Mathematics, Physics and Chemistry than those who do not offer the subject.

Scott (2006) while writing on the article entitled "I am a boy" stressed the fact that male children are gifted than female children when he said

> Gifted males are sensitive, intelligent, detail-oriented, and creative. Unfortunately these traits are not seen as "manly" among mainstream society. Our gifted males are facing ridicule from peers due to their differences and are experiencing internal struggles as a result. As educators and parents, we can empower our gifted males to use journals to express who they really are in response to mainstream society...

Kathleen (2006) stated on her part that "The abilities of highly capable women have rarely received serious recognition, support or guidance. Although there is increasing interest in attracting women to positions of social, political, educational, and scientific leadership, many obstacles inhibit women from realizing their potential in these areas. These include: confusion about the meaning and nature of giftedness; psychological and cultural barriers to owning and displaying one's abilities; and ambivalent attitudes of peers, parents, and significant others towards exceptional ability in women...".

Dona and Elizabeth (2006) in an article entitled "Encouraging bright girls to keep shining" said that "Gifted and talented females face conflicts between their own abilities and the social structure of their world. They confront both external barriers (lack of support from families, stereotyping, and acculturation in home, school, and the rest of society) and internal barriers (self-doubt, self-criticism, lowered expectations, and the attribution of success to effort rather than ability..."

Myra and David (2006) said in "Failing at Fairness: How Our Schools Cheat Girls" stated that "Provides shocking evidence of the gender bias that prevents girls from receiving the same education as boys".

Barbara (2006) writing on "Gender and Genius" said "Gifted boys and girls need to learn to cope with their giftedness while carefully following prescribed gender roles if they want to avoid the rejection of their communities. How were these gender roles shaped, and how did we get our ideas about what gifted girls and gifted boys should be like?".

Barbara and Megan (2006) said in "Gender and Giftedness" that "Both gifted girls and gifted boys experience conflicts between gender identity and achievement motivation. These conflicts can prevent gifted young people from attaining the education they need, from following through on career goals, and from forming satisfying and healthy relationships. Social pressure to attain ideals of masculinity and femininity often works against the development of talent in young people. An understanding of gender and giftedness can help counselors to guide young

people through the critical "milestones and danger zones" in which the fulfillment of talent is threatened by gender socialization... (RTF file)".

David and Camilla (2006) writing on "Gender Differences in Abilities and Preferences Among the Gifted: Implications for the Math / Science Pipeline" quoted that "Recent studies on gender differences in cognitive functioning have reported that males and females are converging toward a common mean on a variety of abilities... In mathematically gifted samples, disparate male / female proportions are well known... The resulting proportion of males to females at various cutting scores on the SAT-M was approximately as follows: SAT-M >= 500, 2/1; SAT-M >= 600, 4/1; SAT-M >= 700. The effect of these disparate ratios for the math / science pipeline is clear: a greater number of males than females will qualify for advanced training in disciplines that place a premium on mathematical reasoning...".

David, Klawe and Sullivan (2006) said that "the aims of his study was to first understand why there is such a significant difference between girls and boys in choosing IT as their careers. He then introduced an overall program aiming to understand and tackle the issue of low participation of women in the IT field...".

Lynn (2006) writing on "Gender Issues in Gifted Education" stated that "For whatever reason, gifted females may hold poor perceptions of their mathematics and science abilities...".

In their work "Gender Differences in High School Students' Attitudes Toward Mathematics in Traditional Versus Cooperative Groups" (2006), Lisa and Karen opined that recent research indicates that the gap between male and female students' mathematics achievement is gradually beginning to diminish. While Dona and Nancy (2006) were of the view that for all members of a regular classroom, suggested strategies are designed to encourage diverse kinds of students - including girls and others who are less likely to develop their high level intellectual abilities - to stay or become engaged with learning, Lynn (2006) is of the view that the prodigy phenomenon has recently begun to receive attention, the gifts and fates of girl prodigies have largely remained unnoted. His article represents an effort to call attention to the existence of extraordinary talent in young girls by collecting, for the first time, a number of cases of girls' early prodigious achievements.

Linver et.al (2006) writing on "Influences of Gender on Academic Achievement" said "For both boys and girls, math grades fall over the course of junior high and high school. Young women achieve at comparable or higher levels in math as males, but their interest especially for the high achieving females, is the same or lower than males. Our results, also, suggest that for young men in higher-level math tracks, math interest is much more strongly related to math school grades than for young women in the same math courses".

Research with talented females has revealed a number of internal barriers, personal priorities, and decisions that have consistently emerged as the reasons that many either cannot or do not realize their potential. These barriers, priorities, and personal decisions were identified in hundreds of interviews conducted with girls and women at various ages, stages across the life span and in a variety of occupations. Sally (2006)

One way [to reverse the trend of women being underrepresented in technical and scientific careers] is to create an accelerated educational environment where females do not have to downplay their intellectuality to be accepted by peers. Kathleen (2006)

Thinking about role models for women in popular culture, I was really disgusted. ...is always self-awareness, which is not narcissism. And for gifted women, that absolutely includes the recognition of giftedness, because most women who are gifted, as you well know, think they're freaks, and feel horribly different -- isolated, alienated, ostracized, 'What's wrong with me?' Douglas (2006).

Are boys born better at math? Experts try to divide the influences of nature and nurture. Lawrence H. Summers, president of Harvard University, had said that "intrinsic" differences in aptitude between the sexes might be an important reason that men dominate the science-and-engineering work force. Researchers who study gender differences say Mr. Summers's emphasis on innate aptitude simply doesn't add up.

Camila et. al (2006) in their "Sex Differences in Mathematical Reasoning Ability at Age 13: Their Status 20 Years Later" that follow-up of mathematically gifted adolescents whose earlier assessments revealed robust gender differences in mathematical reasoning ability. Both genders became exceptional achievers. Earlier sex differences in math ability did predict differential education and occupational outcomes. Profile differences in abilities and preferences are longitudinally stable.

Research with talented girls and women has revealed a number of personality factors, personal priorities, and social emotional issues that have consistently emerged as contributing reasons that many either cannot or do not realize their potential, Sally (2006).

In the study of the organization of cognitive abilities and gender differences in young children advanced in mathematical reasoning, Nancy (2006) observed that Boys scored higher on 8 of 11 quantitative measures, 0 of 3 verbal measures, and 1 of 3 spatial measures.

Thomas (2006) wrote that the results of his study indicate that the racial, ethnic, and gender dynamics between students and teachers have consistently large effects on teacher perceptions of student performance. However, the effects associated with race and ethnicity appear to be concentrated among students of low socioeconomic status and those in the South. Since these teacher perceptions are clearly likely to influence educational opportunities as well as the classroom environment, this evidence implies that these classroom interactions make important contributions to the observed demographic gaps in student achievement.

Sylvia (2006) writing on "Ten Tips for Raising Girls" said we should help stimulate the development of girls' self-esteem and confidence. That this will go a long way in making girl more confidence in their academics.

Kathleen et al (2006) in their work "To thine own self be true, A new model of female talent development" said and I quote "An innovative model of female talent development based upon the life experiences of gifted women from a wide variety of backgrounds and talent domains, synthesized from original studies contributed by more than 20 scholars, psychologists, and educators." Issues addressed by this model are the personal, professional, and cultural challenges common in gifted females as well as strategies for coping with them, spheres of influence and achievement to which gifted women aspire, and ways to help gifted women and girls identify and actualize their talents and gifts.

Thomas (2006) in his article entitled "Using biography to counsel gifted young men" he said "...focuses on four issues confronting bright young men: underachievement, self-inflicted pressure in athletics, cultural alienation, and father-son relationships." The author proposes the

use of biography as a counseling strategy through which bright young men may gain helpful insights to deal with the problems they face.

Laura (2006) writing on "What Math Gender Gap?" stated that "For all of the noise, young women are going into some sciences. Women earn 46% of biology Ph.D.s. They fill more than half of incoming medical school classes. It's just that their proportion in pure physical sciences, while rising, remains low. But physics isn't tougher than biophysics, which suggests that these choices have little to do with aptitude or confidence. In fact, studies suggest girls simply don't view pure math and physics as practical or varied enough to justify the slog to professorship.

METHODOLOGY

In this section, the various techniques used in the analysis of data are presented as well as the presentation of data. This was followed by some preliminary analysis of the data. The data used for this work is secondary in nature. They were obtained from student's record sheet for the sessions 1999 - 2002 sessions of the Department of Statistics, Nnamdi Azikiwe University, Awka. Anambra State Nigeria. The number of A's, B's, C's, D's, E's, and F's obtained in each level were collected based on sex. The student's Final Cumulative Grade Point Average (FCGPA) was also obtained. A course failed in year one is term F for year one, year two etc till when it is cleared. Due to the fact interest is basically on the comparing of academic performance between male and female students, t-test was used to do the comparison at the stage.

$$t_{cal} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{Sp^2(\frac{1}{n_1} + \frac{1}{n_2})}}$$

$$Sp^2 = \frac{(n_1 - 1)S_1{}^2 + (n_2 - 1)S_2{}^2}{n_1 + n_2 - 2}$$

$$\bar{X}_1 = \frac{\sum_{i=1}^{n} X_{1i}}{n_1}$$

$$\bar{X}_2 = \frac{\sum_{i=1}^{n} X_{2i}}{n_2}$$

$$S_1{}^2 = \frac{\sum_{i=1}^n X_{1i}{}^2}{n_1} - \left(\frac{\sum_{i=1}^n X_{1i}}{n_1}\right)^2$$

$$S_2{}^2 = \frac{\sum_{i=1}^n X_{2i}{}^2}{n_1} - \left(\frac{\sum_{i=1}^n X_{2i}}{n_2}\right)^2$$

Where $\bar{X}_1$ = Mean of group one. $\bar{X}_2$ = mean of group two. n_1 = number in group one

n_2 = number in group two, $S_1{}^2$ = Variance of group one. $S_2{}^2$ = Variance of group two.

H_o: Male perform likely as female students in the different grades

H_1:   There is a significant difference in the performance of male and female students as regards the grades obtain in various level.

We will reject the null hypothesis if and only if our $/t_{cal}/ > t_{tab}$ or P- value < 0.05 otherwise we accept.

Simple linear regression was used to determine the trend equation for the numbers of grades obtain over the years by sex, to determine whose performance is on the increase and at what rate. Using Least Square Method to determine the value of the parameters of the model, we have;

$\wedge$

$Y = \beta_0 + \beta_1 X + e$

$\beta = (X'X)^{-1}X'Y$

The fitted model will be tested for its adequacy using ANOVA. The hypothesis of interest will be

$H_o: \beta_i = \beta_j = 0$ vs $H_i : \beta_i \neq B_j \neq 0$

Then ANOVA TABLE is given by:

Table 1: ANOVA Table for testing model adequacy

Sourced of Variation	Df	Sum of Squares	Mean Sum of Square	F-ratio
Regression	K	$SSR = \beta`X`Y - NY^2$	$MSR = SSR/K$	MSR/MSE
Error	$N - k - 1$	$SSE = Y^1Y - \beta X^1Y$	$MSE = SSE/N - k - 1$	
Total	$N - 1$	$SST = Y^1Y - NY^2$		

F-ratio obtain will be compared with a table F- value obtain from an F-table at K, and n-k-1 degree of freedom or compare the p-value with the level of significance. If the model is adequate, proceed to test which of the parameters made the model to be significant using t-test

RESULTS/FINDINGS

Using two packages: Microsoft Excel and Statistical Package for Social Sciences (SPSS version 20) to run the analysis, the following results were obtained. It is established that the Grades A, B, and C contribute positively to students Final Cumulative Grade Point Average (FCGPA), while the grades D, E and F contribute negatively to FCGPA. This being a guide to students, they tend to acquire more of A, B and C than D, E and F if they intend to graduate with good standing. Thus both male and female students try to outwit each other in the grades they obtain in the level courses. From the table below (Table 2.0) it could be seen that the only level grades in which both male and female students performed significantly different is in year 3E, Year 4A, D, and E. In those grade the Female students have an upper hand in Year 4A's (an upper grade) while the male students have upper hand in the lower grades Year 3E, Year 4D and 4E.

Table 2.0 : - Grades of Students from Year One to Year four by sex as well at t – value.

	FEMALE (n_2 =80)		MALE(n_1 =88)				
Levels	MEAN	SD	MEAN	SD	t-value	p-value	Remark
Y1A	1.712	1.787	2.045	2.073	1.11	0.2687	Not Significant
Y1B	3.163	1.571	2.773	1.975	-1.406	0.1615	Not Significant
Y1C	4.388	1.958	4.159	1.735	-0.802	0.4239	Not Significant
YID	2.188	1.379	1.920	1.375	-1.256	0.211	Not Significant
YIE	3.100	1.966	3.434	2.253	1.013	0.3127	Not Significant
Y1F	2.888	2.239	3.193	2.716	0.791	0.4298	Not Significant
Y2A	2.138	2.042	1.727	1.868	-1.36	0.1757	Not Significant
Y2B	2.625	1.844	2.739	1.520	0.437	0.6625	Not Significant
Y2C	3.35	1.744	3.375	1.967	0.087	0.9309	Not Significant
Y2D	1.513	1.212	1.375	1.177	-0.746	0.457	Not Significant
Y2E	2.375	1.694	2.648	2.006	0.947	0.345	Not Significant
Y2F	2.600	2.781	2.557	2.943	-0.097	0.9225	Not Significant
Y3A	2.977	2.801	2.182	2.598	-1.904	0.0586	Not Significant
Y3B	3.638	2.246	3.205	2.018	-1.316	0.1900	Not Significant
Y3C	3.8	1.983	3.466	1.819	-1.139	0.2564	Not Significant
Y3D	1.337	1.201	1.591	1.467	1.218	0.225	Not Significant
Y3E	2.163	2.125	3.011	2.943	2.575	0.0109	Significant
Y3F	2.5	2.873	1.975	3.702	1.02	0.3094	Not Significant
Y4A	3.663	2.595	2.386	2.136	-3.492	0.0006	Significant
Y4B	3.275	1.929	3.193	1.674	0.294	0.7689	Not Significant
Y4C	3.313	1.825	3.159	1.575	-0.585	0.5596	Not Significant
Y4D	1.1	1.411	1.625	1.225	2.581	0.0107	Significant
Y4E	2.362	2.058	3.705	2.662	3.63	0.0004	Significant
Y4F	1.5	3.694	2.023	4.130	0.861	0.3903	Not Significant

The students performed equally likely in all the other level grades but a critical look at the mean grades obtained reveal other hidden pattern. In the upper grades (A, B, and C) the female students had more of these grades in Year 1B, C, 2A, year 3 and 4 A, B, and C than the male students. The male had upper hand in Year 1A, 2B, and 2C only. This shows that the female had more of the upper grades than their male counterpart. On the lower grades (D, E and F) the female students had more of these grades in Year 1D, 2D, 2F and 3F's, while the male students had more in year 1E, 1F, 2E, 3D, 3E, 4D, 4E and 4F's. This implies that the male students had more of the lower grades than the female students. Graphically, this is shown in the following figure.
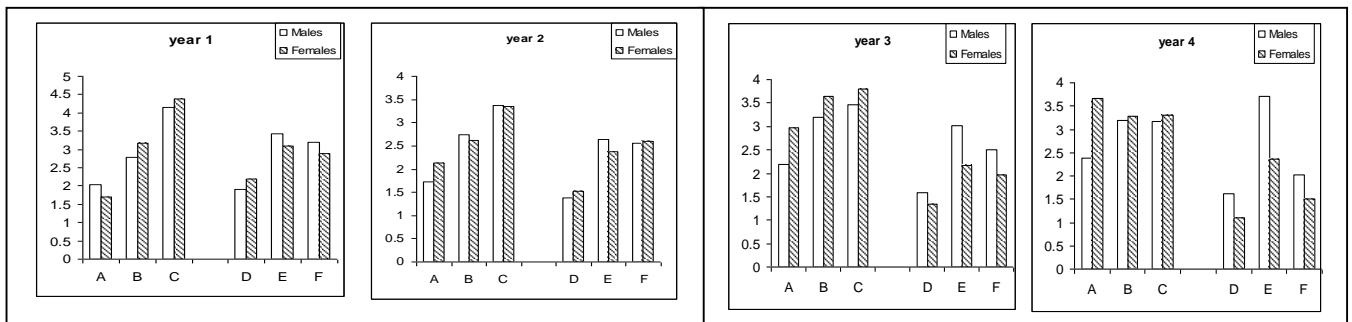

Figure 1.0: Mean number of grades obtained by Male and Female student by their level.

Generally, looking at the total number of these grades (A, B, C, D, E and F) obtained by male and female students from their year one to their year four, we have the following table.

Table 3: - Total number of grades obtained by students from their year one to their year four by sex as well as the t-value.

	MALE		FEMALE		t-value	p-value	Remark
	MEAN	SD	MEAN	SD			
A	8.341	6.74	10.488	7.432	-1.963	0.0513	Not Significant
B	11.909	4.317	12.7	4.602	-1.149	0.2521	Not Significant
C	14.159	3.980	14.850	4.032	-1.117	0.2657	Not Significant
D	12.795	6.092	10	5.628	3.08	0.0024	Significant
E	6.511	2.779	6.138	2.915	0.851	0.3962	Not Significant
F	10.273	4.912	8.963	9.563	0.781	0.4358	Not Significant
FCGPA	2.667	0.688	2.912	0.618	-2.421	0.0165	Significant

A critical look at the Table 3 shows that the female students had more of the upper grades generally put together than the male counterpart. That is they had more of A's, B's and C's. The male students are "champions" in the lower grades D, E, and F. This reveals that generally speaking, the female students perform better than the male students. Graphically, this can be represented in the following figure.
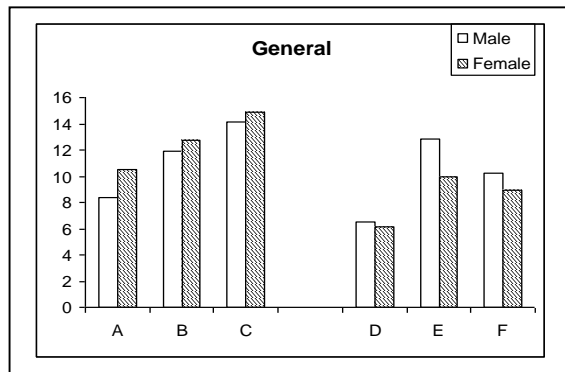
Figure 2 : - The mean number of grade obtained by Male and Female students

The general assessment of student's academic performance is by their FCGPA. When the FCGPA of the students were compared using t-test. The results show that there is a significant difference in their FCGPA based on sex. On a critical look at the mean FCGPA, we found out that that of the female is higher than that of the male students. Thus, this further confirms that female students perform better than their male counterpart. The results are shown below.

Table 4 : - FCGPA of students by sex as well as t-value

	Male		Female		t-value	p-value	Remark
	Mean	SD	Mean	SD			
	2.667	0.688	2.912	0.618	-2.421	0.0165	Significant

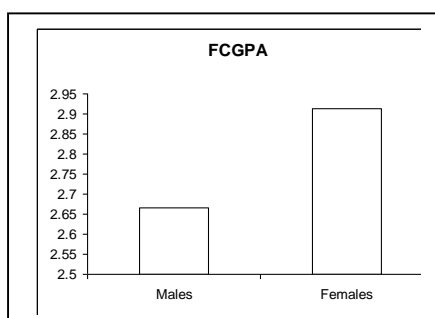This can be seen clearly from the figure below

Figure 3: - Graph showing mean FCGPA by sex of students.

We intend to use time series regression to determine the effort male and female students are putting in their study in order to improve their performances over the years of study. Thus, regressing the individual grades obtained over the years against coded years of study.

Regression models were fitted for both male and female students

Table 5: Regression model for males and Female students

	Female Students			Male Students		
	Model	F-/p-value	Sig	Model	F-/p-value	Sig
A's	0.949 + 0.669t	136.281/0.007	sig	1.716 + 0.148t	1.812/0.311	Not sig
B's	2.838 + 0.135t	0.417/0.584	Not sig	2.546 + 0.173t	6.214/0.130	Not sig
C's	4.407 – 0.277t	2.082/0.286	Not sig	4.267 – 0.291t	6.136/0.132	Not sig
D's	2.395 – 0.344t	18.594/0.05	sig	1.795 – 0.0669t	0.349/0.615	Not sig
E's	3.107 - 0.243t	2.751/0.239	Not sig	2.906 + 0.118t	0.238/0.674	Not sig
F's	3.438 – 0.426t	9.779/0.089	Not sig	3.460 – 0.409t	12.538/0.071	Not sig

From the above fitted time series regression, one can observe the following

a. In the higher grades A, B and C, both male and female student put in efforts in increasing the number of A's and B's and reducing the number of C's obtained as they progress in years of study. An obvious issue there is that in the number of A's obtained (the highest grade), the female students are putting up significant effort in increasing the number of A's whereas the male's effort is not significant. The rate of increase is even more in the female model than the male model. Both sexes of students do not significantly increase the number of B's they obtained over the years. On the number of C's obtained, both male and female students put in efforts to decrease the number since it is the poorest grade among the higher grades. The rate of decrease is faster in male than female. C's contribute positively to FCGPA, base on this one can say that the female students perform better and put in more efforts in improving their FCGPA than the male students in terms of higher grades.

b. In the lower grades, D, E and F, both sexes of students put in efforts in reducing the number of D's and F's obtained over the years. On a critical look at the models, it further shows the supremacy of the female students over their male counterpart in terms of efforts they put in their study. The rate of decrease is faster in the female model than the male model. Serious students should strive to decrease the number of D, E, and F he or she gets since this grades pull down the FCGPA. On the number of E's obtained by students, whereas the female students are putting more effort in reducing the number of E's, the male students are increasing theirs, thus putting in more efforts in pulling down their FCGPA.

SUMMARY

This work started with an introduction on the research topic and highlighted the reason/objective of the study which can be summarized to include gender differences in academic performances. The result shows that

1. Female students perform better than their male counterparts.

2. The female students score high in the upper grades A's, B's and C's while the Male student have more of D's, E's and F's.

3. Both Male and Female students are putting in more efforts over the years in increasing the number of A's and B's they obtain. They also try their best in decreasing the number of C's, D's and F's.

4. On the number of E's, the female students are decreasing number they get so as to bring up their Final Cumulative Grade Point Average (FCGPA), whereas the male students are increasing their E's thereby decreasing their FCGPA.

5. The rate of improvement over the years is faster by the female students than the male students.

6. The female students have a higher FCGPA than the male students. The difference was significant at 5% level of significance.

CONCLUSION

Conclusively, we can say from the results/findings of this research work that the female students perform better than the male students. The general assessment of student performance in on their Final Cumulative Grade Point Average (FCGPA), the analysis done shows that the female students have higher FCGPA, so they perform better.

RECOMMENDATIONS

Having successfully completed this research work, I wish to make the following recommendations

1. Employers of Labour should stop discriminating when conducting interviews.

2. The Male students should be more serious with their studies

3. The female students should "never" allow the male students to outwit them in academic performance.

4. More research work should be done on this topic by including more variables.

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