
Effects of Gender on Academic Achievement and Retention of Students of Colleges of Education (Technical) in Technical Drawing

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Abstract: This work investigated the effect of gender on academic achievement and retention of students of colleges of education (technical) in technical drawing. The design of the study was pretest, posttest quasi experimental design. The study was carried out in colleges of education (technical) in Anambra and Enugu States of Nigeria. Two research questions and two null hypotheses guided the study. The population for the study was 122 year one students of school of technical education at Federal college of education (technical) Umuozu in Anambra State and Enugu State college of education (technical) in Enugu State. The instrument used for data collection was technical drawing achievement test (TAT). The instrument had three versions: pretest, posttest and retention test which were the same except for the reshuffling and swapping of the questions and options of the 60 questions used for the study. The instrument was subjected to face and content validation. The reliability coefficient using Kuder Richardson (K-R 20) was 0.78. The reliability test was conducted using 20 students at Federal college of education (technical) Asaba in Delta State of Nigeria. Data collected for the study were analyzed using mean with standard deviation to answer all the research questions. Analysis of covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The major finding was that the male students of colleges of education (technical) have a better academic achievement and retention in technical drawing when compared to their female counterparts. Based on the finding, it was recommended that the education of girls in technical drawing and technology education should be encouraged.

Keywords: Gender, achievement, retention, technical drawing.

INTRODUCTION

The term gender can be defined as the amount of masculinity and femininity found in persons [1]. Gender is the range of physical, biological, mental and behavioral characteristics pertaining to and differentiating the feminine and the masculine population [2]. Gender seems to be one of the factors that affect students' academic achievement especially in the technical education. It affects the students' academic achievement and retention in technical drawing. Female students attributed poor performance in technical education to their lack of ability, while men also attributed it to lack of hard work. Female students are more susceptible than male students to the negative consequences of 'fear of successes' or 'fear of failure'. This can lead to great difference in academic achievement and retention and more specifically to female students underperforming their male counterpart [3]. This susceptibility of the female students makes them to have poor academic achievement in technical drawing. The academic phobias which are easily seen on female students do make them to have poor result in technical education [4].

Academic achievement and retention in relation to gender is based primarily on the socio-cultural difference between girls and boys. Some vocations and professions have been regarded as men's while others as women's. It is a well-known fact that parents assign task like fixing the bulbs, climbing ladders to fix or remove things to the boys. On the other hand, chores like dish washing, cooking and cleaning are assigned to the girls. In a nut shell, what are regarded as complex, technical and difficult tasks are allocated to boys whereas girls are expected to handle the relatively easy and less demanding tasks. As a result of this, the boys do start early to prepare their mind towards technical information and learning. This equips the boys for technical education in general and technical drawing in particular [2]. Early preparation produces better performance. It seems like the early preparation of the boys gives them a great advantage over girls. The socio-cultural foundation starts early enough to prepare the male for technical works, this help to equip the males better than the females and thereby may help the male to perform better than the females in technical education.

Jim [5] opined that socio-cultural background upbringing is a major reason male students have better academic achievement than female in technical education. According to Jim, another reason females perform poorly in technical courses when compared to their male counterpart can be traced to gender difference in the cognitive abilities of students. He opined that female outperforms males on several verbal skills. Males on the other hand, outperform females in spatial skills tasks such as mental retention, spatial perception and spatial visualization. Marazano [6] stated that gender gap in technical education is biologically driven. He stresses that parental hormones circulating in the brain encourage differential development in the hemispheres of male and females. Many socio-cultural factors jointly and separately depress female interest and achievement in technical education. Smith [7] explained that even technical education teachers discriminate against females. This discrimination attitude creates disadvantaged position for the girls during technical drawing.

The stereotypical discipline associated with males and females also affect the female performance in technical education. The Aristocrats era taught the males military subjects while the female were taught domestic subjects, all in an attempt to prepare them for their roles in the society [8]. Traditionally, technology traits are believed to include remoteness, impersonality, detachment and objectivity [9]. More often than none, these traits are readily associated with the male in the society, while passivity, nurturance and subjectivity are held to be feminine attributes with this association, science and technology seem to be given to masculine gender. According to Brown [10] this attribute and other social psychological barriers alienate girls with potentials.

The concern of this study is that it seems that gender effect the academic achievement and retention of colleges of education (technical) students in technical drawing. The problem of this study therefore is “what are the effects of gender on the academic achievement and retention of colleges of education (technical) students in technical drawing? The purpose of this study is to determine the effects of gender on academic achievement and retention of students of colleges of education (technical) in technical drawing.

Specifically, the study seeks to determined:

- What are the mean achievement scores of male and female students of colleges of education (technical) in technical drawing using TAT?
- What are the mean retention scores of male and female students of colleges of education (technical) in technical drawing using TAT?

Research Questions

The following research questions were posed to guide the study

- What are the mean achievement scores of male and female students of colleges of education (technical) in technical drawing using TAT?
- What are the mean retention scores of male and female students of colleges of education (technical) in technical drawing using TAT?

Null Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

- There is no significant difference between the mean achievement scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT.
- There is no significant difference between the mean retention scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT.

Method

The design of the study was a quasi-experimental research design. The experimental design used nonequivalent control groups involving pre-test, post-test design and retention test. The study was conducted in Colleges of Education (Technical) in Anambra and Enugu States of Nigeria. The population for the study was 122 students of NCE (T), comprised 87 students (81 males and 6 females) from Federal College of Education (Technical) Umunze in Anambra State and 35 students (31 males and 4 females) from Enugu State college of education (technical) in Enugu State who are offering technical drawing. The entire population of 122 was used for the study. There was no sampling because the population was manageable.

The instruments used for data collection was technical drawing achievement test (TAT). The TAT was administered as pre-test, posttest and retention in a disguised manner. The post test was disguised from pretest by renumbering. The retention test was disguised from pretest and posttest also by renumbering. The TAT was a 60 item instrument, of multiple choice questions with four responses option A –D. The technical drawing Achievement Test (TAT) was subjected to face and content validations. Three experts validated the TAT. The technical drawing Achievement Test instrument was subjected to trial testing on students to ascertain the reliability of the instruments. The internal reliability co-efficient of the instrument was computed using Kuder Richardson formula 20 (K-R 20) and the reliability co-efficient of 0.78 was obtained. The reliability test was conducted at

Federal college of education (technical) Asaba in Delta State of Nigeria.

One hundred and twenty-two pre-TAT copies of the instrument were administered on students before the treatment which lasted for six weeks. At the end of the treatment, a post-TAT was administered and two weeks after the post-TAT, retention test was administered. Data collected for the study were analyzed using mean with standard deviation to answer all the research questions. Analysis of covariance (ANCOVA) was used to test the hypotheses formulated for the study at 0.05 level of significance.

RESULTS

Data for the study were presented and analyzed based on the research questions and hypotheses that guided the study. The details are contained in the tables 1-4.

Research question 1

What are the mean achievement scores of male and female students of colleges of education (technical) in their academic achievement in technical drawing using TAT?

Table-1: The mean achievement scores and standard deviation of male and female students of colleges of education (technical) in their academic achievement in technical drawing using TAT

Group	N	Pre-Test		Post-Test	
		Mean	SD	Mean	SD
Experimental (Male)	72	8.12	1.06	8.37	1.08
Control (Male)	36	5.86	0.48	7.82	0.70
Experimental (Female)	6	6.03	0.08	6.33	0.21
Control (Female)	4	5.80	0.23	6.85	0.10

Table 1 shows that the mean achievement score of the experimental group (male) for pretest and posttest are 8.12 and 8.37 respectively and experimental group (female) are 6.03 and 6.33 respectively, while the mean achievement score of the control group(male) are 5.86 and 7.82 and control group (female) are 5.80 and 6.85 respectively. This means that

male achieved better than female in the two groups (experimental and control),

Null Hypotheses One

There is no significant difference between the mean achievement scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT.

Table-2: ANCOVA Table for the test for significant difference between the mean achievement scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT

Source of variation	Sum of square	Df	Mean square	F	Sig.
Corrected Model	842.325	2	421.167	17.118	.000
Intercept	908.728	1	908.728	36.935	.000
Pre	265.055	1	265.055	10.773	.000
Group	180.499	1	180.499	7.336	.169
Error	1943.687	79	24.608		
Total	141367.000	82			
Corrected Total	86.012.685	81			

The result on table 2 shows that the calculated F-value for the group treatment of students of technical drawing on academic achievement in technical drawing using AAT is 7.336 with 0.169 level of significance thus, the null hypothesis of no different between mean achievement score of male and female students of

colleges of education (technical) on their academic achievement on technical drawing using AAT was not rejected at 0.05 level of significance. This means that the f-cal was statistically significantly at p on their academic <0.05 level.

Table-3: The mean retention scores and standard deviation of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT

Group	N	Retention	
		Mean	SD
Experimental (Male)	76	6.92	0.65
Control (Male)	36	5.62	0.49
Experimental (Female)	6	5.53	0.52

Control (Female)	4	5.10	0.12
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Research Question Two

What are the mean retention scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT?

Table 3 shows that the mean retention scores of the experimental groups were 6.92 and 5.53 respectively for male and female, while the control

groups were 5.62 and 5.10 respectively for male and female. This means that the male achieved better when compared with the female.

Hypotheses Two

There is no significant difference between the mean retention scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT.

Table-4: ANCOVA Table for the test for significant difference between the mean retention scores of male and female students of colleges of education (technical) on their academic achievement in technical drawing using TAT

Source of variation	Sum of square	Df	Mean square	F	Sig.
Corrected Model	26.852	2	13.426	20.867	.000
Intercept	58.713	1	58.713	91.251	.000
Pre	7.729	1	7.729	12.013	.001
Group	6.411	1	6.411	9.964	.002
Error	50.830	79	.643		
Total	6846.280	82			
Corrected Total	77.682	81			

The result on table 4 shows that the calculated F-value for the group of students of technical drawing on academic achievement in technical drawing is 9.964 with 0.002 level of significance thus, the null hypothesis of no different between mean retention score of male and female students colleges of education (technical) on their academic achievement on technical drawing using TAT was rejected at 0.05 level of significance. This means that the f-cal was not significantly difference at $p < 0.05$ level. Therefore, there is significant difference between the mean retention scores of male and female students of colleges of education (technical) on their academic retention in technical drawing using AAT.

DISCUSSION OF FINDINGS

The finding of the study on research question 1 showed that male students of colleges of education (technical) had a higher mean achievement score than the female students. The finding reveled that male students of colleges of education (technical) had a better academic achievement in technical drawing when compared with their female counterpart. The finding was in consonance with an earlier study conducted by Kelsey [11] on a similar study and the result of the study indicated that male students retain technical knowledge more than the female students.

The result of hypothesis 1 indicated that there was no significant difference between the mean achievement scores of male and female students of colleges of education (technical) on their academic

achievement in technical drawing using TAT. The null hypothesis was therefore not rejected. The result from research question two showed that the male students in colleges of education (technical) obtained higher retention score than the female. The hypothesis 2 tested indicated that there was no significant difference between the mean ratings of students in the two groups. The null hypothesis was therefore not rejected.

CONCLUSION

The conclusion was made based on the finding of the study. The result of the study provided empirical evidence that gender effect the academic achievement and retention of students of colleges of education (technical) in technical drawing. The study showed that male students had a better understanding and academic performance in technical drawing when compared with their female counterpart. The ability of the male students to retain technical drawing information is higher than that of the female.

RECOMMENDATIONS

The following recommendations were made based on the findings of the study.

- The education of girls in technical courses like technical drawing, science and technology related courses should be encouraged.
- Teachers and parents should start early to develop in the girl child a positive attitude about technical drawing and other technical courses.

- The Federal and State ministries of education should create encouraging incentives for for females in technical education, such as scholarship.

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