



## EFFECT OF USE OF INSTRUCTIONAL MATERIALS AND GENDER DIFFERENCE ON SENIOR SECONDARY SCHOOL STUDENTS' ACADEMIC PERFORMANCE IN AGRICULTURAL SCIENCE IN MAIDUGURI, BORNO STATE, NIGERIA

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### Abstract

**T**his study investigated the effect of use of instructional materials and gender differences on senior secondary school students' academic performance in agricultural science in Maiduguri, Borno State, Nigeria. The objectives of this study were to determine the effect of use of instructional materials and

gender differences in academic performance of students in senior secondary schools in Maiduguri, Borno State. The study used quasi-

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performance*

experimental design with two groups of experiment and control. The target population was fourteen (14) senior secondary schools in Maiduguri. Through stratified random sampling method, three (3) senior secondary schools were selected based on male, female and mixed schools for the study. The

instrument used for data collection was self-developed performance test questions in agricultural science. The performance test in agricultural science was made up of 30 multiple-choice items. The items were drawn from the scope of agricultural science SS1 syllabus. The reliability coefficient obtained was 0.86. The study lasted for five weeks. The data collected was analysed using t-test of independent samples. The mean and standard deviation of the experimental group were higher than the control group, which showed that, there was a significant effect on gender difference in the use of instructional materials on senior secondary school students in Maiduguri, Borno State. The

study concludes that, gender difference exit on students taught with instructional materials than those taught without instructional materials. Based on the findings of this study, it was recommended that, Borno State Ministry of Education should provide different types of instructional materials to schools.

## **Introduction**

**E**ffective teaching and learning is the major concern of teachers and educational administrators. Learning can be reinforced with instructional materials of different types because they stimulate, motivate as well as arrest learners' attention during instructional processes.

According to Eccles (2001), differences among students are commonly observed in practice and in research and one of the most obvious differences are in gender. The male students for example appear to predominate in classroom discussions while the female tend to speak and write more fluently than the male. Abayomi (2008) noted that, gender differences in English performance with strong relationship to subject matters in which girls slightly outscored boys on performance in writing and spoken language. Similarly, Data from the National Centre for Educational Statistics (NCES, 2000) indicates that differences in both interest and self-confidence in performance in science exist between

boys and girls and that these differences begin in the early years and become more pronounced with age.

Omotola (2005) found that girls tend to outperform boys on the test requiring clerical speed and accuracy in language test. The boys on the other hand outperform girls when it comes to mechanical relations and visualizing relationship between items in space. His study also revealed that males do better in Mathematics than female. However, females tend to do better on mental test in adulthood.

Ngwu (2007) reported that, gender performance or inequalities remain a problem point of the education system. He particularly stressed that the domestic labour that girls engage in should be addressed through schools. He viewed that, the factor responsible for gender differences in academic performance can be attributed to the kind of teaching methods, opinion in curriculum areas, popular attitude towards some subjects and vocational prospect of the students. Ngwu (2007) also reported that international researchers on educational performance in many countries have revealed male superiority in mathematics and most of the physical science subjects and female exhibit superiorities in reading and comprehension. He maintained that in some parts of the world, objective intelligence testing does not support the belief that females are less intelligent than the males.

Ballus and Gagari (1997) surveyed gender difference in academic Performance among secondary school students of Jos North and South Local Government Areas of Plateau State with a sample of 250 students. The data obtained were analyzed using t-test and chi-square. The results showed no significant gender difference in academic performance of boys and girls.

Omofa (2005) noted disparity between boys and girls in level of performance and discovered that boys obtained higher achievement scores than girls. Nevertheless, support for difference between boys and girls concerning attitudes to subject and performance has not been consistent. Traditionally, male are more likely to select science and

engineering tracks and females more likely to select humanities or liberal arts tracks. Recently, efforts have been made in many countries to increase the representation of females in science and engineering. Eccles (2001) notes that a gender stereo-type in arts and science studies exists. It also shows gender-stereotype affecting students performance and academic choice. Since boys believe that they can be perfect in science and girls believe that they can fit better in arts, more boys choose science than girls. He also stated that gender stereotype create gender difference in performance and choice, which in turn results in sex, differences in achievement and career patterns.

Qiang (2000) discussed gender difference in academic achievement and cognitive development in China and noted that male and female are treated differently in Chinese schools and this difference has a negative effect on female learning and achievement. Differential teaching of students may contribute in affective differences between males and females. He found a substantial difference in attitude between male and female Chinese students towards science.

Abayomi (2008) observed a significant gender difference in academic performance among pre-NCE in Kashim Ibrahim College of Education, Maiduguri, and Borno State. The female students had a higher mean score than their male counterparts. Mallum (2008) in his study found that at primary school level, girls do well as boys and sometimes-even better. However, once they graduate from primary school, females perform less in a variety of subjects, especially in physical sciences, engineering and technology related subjects.

Cries (2000) investigated the differences of gender in academic achievement. Hamman-Tukur (1997) found that, there was no gender difference in achievement in mixed schools in the same group. Similarly, Wamdeo (2003) found no significant gender difference in mathematics achievement in both mixed and single schools.

### **Statement of the Problem**

The researchers observed that students have persistently been performing low in both internal and external examinations in Agricultural

Science in secondary schools. Many researchers have looked into the causes of low performance generally and Agricultural Science in particular. Causes such as lack of instructional materials, wrong use of teaching methods, and lack of adequate infrastructural facilities have been identified as militating against students' performance. However, there is dearth of information on effect of use of instructional materials and gender difference on senior secondary school students' academic performance in agricultural science. Therefore, this study becomes imperative. The study attempted to look at effect of use of instructional materials on students' performance in Agricultural Science.

### **Objectives of the Study**

The objectives of the study were to determine:

1. Gender difference in academic performance of students taught with instructional materials and those taught without it in senior secondary schools in the control group.
2. Gender difference in academic performance of students taught with instructional materials and those taught without it in senior secondary schools in the experimental group.

### **Hypotheses:**

**Ho<sub>1</sub>.** There is no significant effect in the use of instructional materials on academic performance of male and female agricultural science students in the control group.

**Ho<sub>2</sub>.** There is no significant effect in the use of instructional materials on academic performance of male and female agricultural science students in the experimental group.

### **Methodology**

The research design adopted for this study was quasi-experimental design. According to Umaru (2004), Quasi-experimental design is described as one of the best and most practical to assess the effect of

treatment on two groups, one control one experiment. In experimental studies therefore, the experimental and control group are identical in all respects except in terms of treatment of variables.

The target population for this study comprised of fourteen (14) senior secondary schools, three (3) were selected through simple and stratified random sampling techniques. The use of stratified sampling method according to Ali (2006) is the random selection of subjects based on certain defined population such as male, female and mixed school. Hence, this sampling technique was appropriate because the researcher was interested in the population that has unique characteristics such as male, female and mixed school.

The SS1 students in each sampled schools were randomly assigned to experimental and control groups. For school A forty (40) students (20 male and 20 females) and 40 students each in B and C were numbered 1-40. Even numbers were grouped into experimental and odd numbers were grouped into control groups, and to get the students' academic performance for the study. First classes as group A were selected as experimental groups in each school while the second classes as group B were selected as the control groups. The experimental group and control group in school A, B and C were 20 students each for the three schools making 60 students.

The instrument for this study was a researcher designed Performance Test in Agricultural Science (PTAS), which contained 30 items all multiple-choice objective test developed by the researchers. The items were carefully drawn from Agricultural Science SS1 syllabus. The students were required to choose the correct answer from the four options lettered A-D. The research was carried out in three phases as follows:

Phase one: Pre-test treatment phase; phase two: treatment and phase three: post-test.

### **Phase one: Pre-test treatment**

In conducting the research, thirty (30) items all multiple-choice with options A-D were drawn from the scope of agricultural science SS1

syllabus. The SS1 students were grouped into experimental and control group in schools A, B and C to conduct the pre-test by the researchers and the agricultural science teachers. After administering the pre- test, the scripts were collected and marked over 100% by the researchers.

### **Phase 2: treatment**

The treatment was carried in periods, in classroom of the schools A, B and C. The treatment groups of experimental and control selected using simple random sampling technique.

The topic taught for the first week was simple farm tools, second week fish farming and method of fish preservation, third and fourth weeks composition and physical characteristics of soil, which were applicable to the students of SS1 that offer agricultural science, and when instructional materials are not available during the treatment , researcher supplied them, then students in the experimental group were exposed to instructional materials under the teachers' supervision for a period of 30 minutes and the students were encouraged to take enough notes that could be useful to them in the post-test. The control group students also were exposed to teaching method of the same content used for experimental groups, they were taught using convectional classroom format, and classroom contained chalkboard, duster and chalk, which were used for instruction. The treatment for both groups lasted for five weeks.

### **Phase three: Post-test treatment**

Both groups (experimental and control) were given a revision before they wrote the post test. The questions were given to students to answer under the supervision of the researchers. The scripts were retrieved, marked and graded by the researchers.

## **Results and discussion**

### **Hypothesis one**

**H<sub>01</sub>:** There is no significant effect in the use of instructional materials on academic performance of male and female Agricultural Science students in the control group.

To determine the effect on the use of instructional materials on academic performance of male and female in the control group, the data collected was analysed using t-test of independent samples and the result is presented in table 1.

**Table 1: Result of t-test on Academic Performance of Male and Female Agricultural Science Students in the Control group.**

| Gender         | Mean   |          | Std.D     |          | t     | df  | P.Value | Remark  |
|----------------|--------|----------|-----------|----------|-------|-----|---------|---------|
|                | Sample | Pre-test | Post-test | Pre-test |       |     |         |         |
| Male           | 20     | 51.5000  | 59.6012   | 16.8538  | 6.984 | 137 | .180    | Not Sig |
| Female         | 20     | 55.8500  | 57.9500   | 13.400   | 9.681 |     |         |         |
| <b>P&lt;.5</b> |        |          |           |          |       |     |         |         |

Table 1 above, indicates that male in the control group had mean performance of 51.5000 and female had 55.95at pre-test level. The mean at post-test level, male performance was 59.6012 and female was 57.9500, comparing the mean at post-test level, male performance was the same with female. In addition, the p-value is .180, this shows that the use of instructional materials has no significant effect on the academic performance of male and female students in the control group, therefore null hypothesis one has been accepted .

### Hypothesis two

**H<sub>02</sub>:** There is no significant effect in the use of instructional materials on academic performance of male and female agricultural science students in experimental group.

To determine the effect on the use of instructional materials on academic performance of male and female in experimental group the data

collected was analysed using t-test of independent samples and the result is presented in table two.

**Table 2. Result of t-test on Academic Performance of Male and Female Agricultural Science Students in the Experimental group.**

| Gender         | Mean   |          | Std.D     |          | t    | df | P.Value | Rmk  |           |
|----------------|--------|----------|-----------|----------|------|----|---------|------|-----------|
|                | Sample | Pre-test | Post-test | Pre-test |      |    |         |      | Post-test |
| Male           | 20     | 60.50    | 67.40     | 6.98     | 6.98 | 38 | 1.806   | 0.79 | Not sig   |
| Female         | 20     | 55.59    | 62.90     | 10.40    | 9.68 |    |         |      |           |
| <b>P&lt;.5</b> |        |          |           |          |      |    |         |      |           |

Table 2 above indicates that male and female students mean performance in the experimental group at pre-test, male had mean performance of 60.5000 and female had 55.9500. Then post-test of male was 67.400 and female mean score was 62.9000. Comparing the mean using t-test of significant, the result shows that male in the experimental group significantly performed better than the female, therefore null hypothesis was rejected in favor of the alternative.

### Discussion

The findings, influence of gender on the academic performance of students in agricultural science in the control group when taught without instructional materials were examined. The result of analysis of t-test on table 1 showed no significant gender difference at 0.05 level of significant for learners taught without instructional materials. Male in the control group had the same mean and standard deviation with the female while in post-test of control group the performance of male score were higher than the female, the result showed that, there was a significant difference in performance by gender. This finding showed that gender

has influence on the academic performance of students taught without instructional materials. This finding agreed consistent with Cries (2000), Abayomi (2008), who found a significant gender differences in academic performance among senior secondary school students. Female students had a higher mean score than their male counterpart. Similarly Qiang (2000) reported that females tend to outperform males in test requiring clerical speed and accuracy and in language test, while males outperforms females when it comes to mechanical relations and visualizing relationship between items space.

The influence of gender on the academic performance of students in agricultural science when taught with instructional materials in the experimental group was examined. The result of the analysis t-test in table 2 showed significant difference at 0.05 level of significant between male and female students in the experimental group for learners exposed to instructional materials. This result showed that gender had influence on the academic performance of students in agricultural science when taught with instructional materials. These findings on gender agreed with the earlier findings of Mallum (2008) on gender and performance in Biology. The result on table 2 shows that the t-test of female students taught with instructional materials did not performed significantly higher than the male. This signified non-impact on the performance of male students in the experimental group taught with instructional materials. The analysis of mean score between post-test of male and female students taught with instructional materials in table 2 revealed that the hypothesis was rejected because the mean score of male was greater than the female.

### **Conclusion**

The study concludes that, students taught with instructional materials perform better than those taught without instructional materials. This shows that students learn and perform better when they are taught with instructional materials because the use of instructional materials gives

students the opportunity to see, feel and touch the materials during teaching and learning. Therefore, instructional materials were effective on supporting students' performances and retention towards Agricultural Science.

### **Recommendations**

Based on the findings of this study the following recommendations were made:

1. Borno State Ministry of Education should provide different types of instructional materials to schools since the findings of this study showed that students taught with instructional materials performed better than students taught without instructional materials.
2. Borno State Ministry of Education should organize seminars, workshops and regular training of teachers on the use of instructional materials in the process of teaching and learning Agricultural Science.

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