

GENDER DIFFERENCES IN STUDENTS' ATTITUDE TOWARDS BASIC SCIENCE IN JUNIOR SECONDARY SCHOOLS

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Abstract

The study investigated gender differences in students' attitude towards Basic Science in Junior Secondary Schools in Ekiti State. A descriptive survey research method was used on 300 JSS 2 students selected from 12 public schools across the three senatorial districts in the State using multistage random sampling technique. Two instruments were used for the study. These included Scientific Attitude Inventory II (SAI II) and Basic Science Achievement Test (BSAT). The study revealed that there was no significant difference between students' gender and achievement in Basic Science. The study also showed that there was a significant relationship between students' attitude and achievement in Basic Science. The study further revealed that there was no significant difference between students' gender and attitude towards Basic Science. Based on the findings of the study, it was recommended among other things that Basic Science teachers should not be gender biased when teaching their students and teachers should exhibit positive attitude towards teaching the subject.

Keywords: gender, basic science, students' attitude, junior secondary schools

1. Introduction

The consequence of gender differences and perhaps attitude of students towards science subjects have been widely reported across the globe. For example, in a study on the gender differences in attitude towards science, Trankina (2005) presented the findings of a nationwide survey taken from 1972 to 1990. The study revealed that females have less confidence in science than male counterparts. The findings from the questions also revealed a more negative attitude towards science in females, 'more females than males believed that science breaks down people's ideas of right and wrong and that science pries into things'. The findings from the study further stressed that the negativity may account for the lower number of women than men in science fields.

In an examination of data from National Assessment of Education Progress's (NAEP) on gender differences in attitude and performance in science for four age levels; 9, 13, 17 and young adults-25-35 years. Khale (2005) showed that males outperform females in all age groups with the differences increasing with age. Can & Boz (2012) affirmed that high school students' attitude towards learning Chemistry decreased significantly with increase in grade levels. The study further showed that female students' attitude towards Chemistry were more positive compared to their male counterparts. Cheung (2009) in a study involving grades 4-9 students in Hong Kong showed that male students have marginally positive attitude towards Chemistry. In a similar study, Barnes, McInerney, & Marsh (2005) found that boys were perceived to have more positive attitude towards learning Chemistry than girls.

There is evidence that gaps in boys and girls could be attributed to traits that men and women naturally suited to different occupational roles (Marger, 2008). For instance, Wimer, Ridenour & Place (2001) found that both boys and girls showed the enthusiasm for Mathematics in elementary years, but by early adolescence, the percentages of boys enthusiastic about Mathematics dropped from 84 percent to 72 percent, and for girls from 81 percent to 61 percent. Then by high school, only 25 percent of boys and 15 percent of girls considered themselves good for Mathematics. The study attributed this decline to the fact that girls were just not smart enough with an idea that engrained in our society.

Osborne, Simon & Collins (2003) indicated that the most positive attitude to science held by students in all grades were associated with a high level of personal support by the teacher and the comments teachers made in class. The submission of these researchers was similar to the outcomes described by Hargreaves (2000) regarding the positive association between teachers' attitude to teaching and students' attitude to learning. The implication of these findings is that teacher gain emotional rewards from positive incidences with the whole class as well as psychic rewards from individual students' positive development and emotional bond that develop between teachers and students.

In another study of gender effects and attitude towards science, Stake & Nickens (2001) found that having peers to share science interests with would enhance both boys' and girls' imagined future as a scientist. The study also showed that girls reported a strong "niche" among peers for science support that boys and this finding provide evidence that science enrichment programs that encourage a high level of peer interaction may be particular effective in establishing supportive peer networks among adolescent girls. Blickenstaff (2005) suggested that the way in which

teacher teach science may re-enforce negative attitudes about science and make females feel undervalued in this line of work. Also, Adesoji & olatunbosun (2008) found that teachers' positive attitude to the teaching of Chemistry is likely to increase students' achievement in the subject. Therefore, a positive teacher attitude may be important in the development of students' attitude to science.

Contrary to the above findings, Dhattrak & Wanjari (2011) showed that there was no relationship between scientific attitude and achievement of students in science. In view of these conflicting positions on the disparities in males and females attitude to science in schools, this study intended to examine whether there would be any differences between male and female students' attitude towards Basic Science in Ekiti State Junior Secondary Schools.

2. Research Hypotheses

The following hypotheses were generated to guide this study:

- (1) There is no significant difference between students' gender and achievement in Basic Science
- (2) There is no significant correlation between students' attitude and achievement in Basic Science
- (3) There is no significant difference between students' gender and attitude in Basic Science

3. Research Methodology

3.1 Research Design

This study adopted a descriptive survey research method to examine gender differences in students' attitudes towards Basic Science in Ekiti State Junior Secondary Schools.

3.2 Population

The population for the study consisted of all Junior Secondary School 2 students from Ekiti State, Nigeria.

3.3 Sample and Sampling Technique

The sample for the study consisted of 300 JSS 2 students from 12 public schools in which 160 were males and 140 were females. Twelve schools were selected from three senatorial districts of the State using multistage random sampling technique. From each senatorial district, 4 Local Government Areas were selected from where a school was randomly selected each. From each school, 25 students were selected using simple random technique.

3.4 Instrumentation

The two instruments used for this study included the following: Scientific Attitude Inventory II (SAI II) and Basic Science Achievement Test (BSAT). Scientific Attitude Inventory II (SAI II) is a likert scale with four scales (Strongly Agree to Strongly Disagree) that consisted of 22 short items; the items were adapted from the work of Moore & Foy (1997). The items were modified and used for measuring students' attitude towards Basic Science while Basic Science

Achievement Test (BSAT) was 20 questions developed by the researchers from the students' recommended textbooks. The test was aimed at measuring students' knowledge of Basic Science.

3.5 Validity of the Instruments

In order to ensure face and content validity of the instruments, the items of the SAI II and BSAT questions were given to 2 experts in the fields of Science Education, 2 experts in the fields of Language Education and 2 experts in Test, Measurement and Evaluation to adjudge the worth of the items. The comments made by these experts were followed strictly to produce the final copies of the 22 items for measuring students' attitude towards Basic Science and 20 questions for measuring students' knowledge of Basic Science.

3.6 Reliability of the Instruments

The reliability of the instruments was ascertained using split half and test -retest methods. Split half method was used to ensure the reliability of the SAI II and a coefficient of 0.78 was obtained. Test re-test method was used to ascertain the reliability of the BSAT. The test was administered to 30 students who were not part of the study in an interval of two weeks. The results obtained were subjected to Pearson's Product Moment Correlation Analysis with a coefficient of 0.89. These coefficients of 0.78 and 0.89 were considered high enough for this study.

3.7 Data Analysis

The data collected were subjected to inferential statistics such as t-test and Pearson's product moment correlation analysis and all the hypotheses formulated were tested at 0.05 Alpha level.

4. Results

4.1 Testing of Hypotheses

Hypothesis 1

There is no significant difference between students' gender and achievement in Basic Science.

Table 1: t-test showing students' gender and achievement in Basic Science.

Group	N	Mean	SD	df	t-cal	t-table
Male	160	11.79	2.736	298	0.922	1.960
Female	140	12.09	2.881			

P>0.05

Table 1 shows that t-cal (0.922) was less than t-table (1.960) at 0.05 level of significance. The null hypothesis was accepted. This implies that there was no significant difference between students' gender and achievement in Basic Science.

Hypothesis 2

There is no significant correlation between students' attitude and achievement in Basic science.

Table 2: Pearson correlation showing students' attitude and achievement in Basic science

Variable	N	Mean	SD	R	t _{table}
Attitude towards Basic Science	300	65.20	8.335	0.356*	0.195
Achievement in Basic Science	300	11.93	2.804		

***P<0.05**

Table 2 shows that there was a significant correlation between students' attitude and achievement in Basic science ($r = 0.356^*$, $P < 0.05$). The null hypothesis was rejected. Therefore, there was a significant relationship between students' attitude and achievement in Basic science.

Hypothesis 3

There is no significant difference between students' gender and attitude towards Basic Science.

Table 3: t-test showing students' gender and attitude towards Basic Science

Group	N	Mean	SD	df	t-cal	t-table
Male	160	65.78	8.272	298	1.286	1.960
Female	140	64.54	8.388			

P>0.05

Table 3 shows that there was no significant difference between students' gender and attitude towards Basic Science ($r = 1.286$, $P > 0.05$). The null hypothesis was accepted. This implies that there was no significant difference between students' gender and attitude towards Basic Science.

4.1 Discussion

The result of the study showed that there was no significant difference between students' gender and achievement in Basic Science. This finding contradicts the findings of Trankina (2005) which stressed that females exhibit less confidence in science more than their males' counterparts. The study also showed that there was a significant relationship between students' attitude and achievement in Basic Science. This finding corroborates the findings of Can & Buz (2012) and Adesoji & Olatunbosun (2008) which found a significant relationship between students' attitude and achievement in Chemistry. This student's achievement according to the latter is enhanced by teachers' positive attitude to teaching Chemistry. The implication is that the teachers teaching Basic Science should enhance students' attitude positively to increase their gains in the subject. The result of the study further indicated that there was no significant difference between students' gender and attitude towards learning Basic Science. However, Barnes, McInerney & Marsh (2005) found that boys were perceived to have more positive attitude towards learning Chemistry which is a science subject, than girls. However, the finding of this study agrees with the findings of Wimer, Ridenout & Place (2001) which found that boys and girls showed the enthusiasm for Mathematics in elementary years.

5. Conclusion and Recommendations

The study investigated gender differences in students' attitude towards Basic Science in Junior Secondary Schools. It was revealed that there was no significant difference between students' gender and attitude towards Basic Science. The study further depicted that there was a strong relationship between students' attitude and achievement in Basic Science irrespective of gender. In view of this, Basic Science teachers should endeavor to teach with materials which will galvanize the affective domain of their students with a bid to changing their attitude positively towards the subject and therefore enhance their achievement.

In view of the findings of this study, it was recommended that:

1. Teachers of Basic Science should not be gender biased when teaching their students,
2. The teaching of Basic Science should be made interesting by making it practical oriented,
3. Basic Science teachers should exhibit positive attitude towards teaching the subject,
4. All domains of learning namely cognitive, affective and psychomotor should be demonstrated in the course of teaching Basic Science in the classroom.

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