

# African Research Review

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*An International Multi-Disciplinary Journal, Ethiopia*

*Vol. 4 (3a) July, 2010*

ISSN 1994-9057 (Print)

ISSN 2070-0083 (Online)

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## **Technological Attitude and Academic Achievement of Physics Students in Secondary Schools** *(Pp. 150-157)*

**Stephen, U. S.** - Department of Science Education, University of Uyo, Uyo,  
Akwa Ibom State, Nigeria, West Africa  
E-mail: utibeabasistephen@yahoo.com

### **Abstract**

*This research study was aimed at investigating the effect of technological attitude of students on academic achievement in Physics. Four co-education schools were randomly drawn from urban centers of Uyo and Abak Local Government Areas of Akwa Ibom State, Nigeria. This gave sample size of 110 senior secondary two physics students. Two researcher-made instruments, students' attitude towards technology (SATTQ) and Physics Achievement Test (PAT) were used in generating the data for the study. Three research hypotheses were stated to guide the investigation. The data generated were analyzed using t-test statistics. The findings of the investigation revealed that technological attitude, type of school and gender showed significant effects on students' achievement in physics.*

### **Introduction**

Physics is a branch of physical sciences that concerns mainly with matter in relation to energy (Olumuyiwa and Okunola, 1992). Physics, as a science subject, has been acknowledged as a pre-requisite for the study of several courses in the universities, for examples engineering, medical and other applied science courses need physics. In view of the obvious importance of physics in scientific and technological advancement of any nation, and its

usefulness in nearly all fields of human endeavour, the poor performance of students in the subject at both secondary and post-secondary levels in the state in particular and country at large has been a source of concern to various people and government at various times (Ogunneye, 1982). According to previous studies, a lot of factors are attributed to this poor performance in secondary and post secondary school physics. Onwioduokit (1996) attributed this to insufficient man power, equipment, poor attitude (technological) of students and poor understanding of the concepts due to their difficult nature.

In school, the child is the major tool of the teacher's trade. If the process of teaching is to proceed smoothly, efficiently, pleasurably and result oriented, it is essential that the teacher should have some knowledge of human nature in general and in the individual students in particular. The knowledge of the individual student is both desirable and necessary because inspite of the many references that are made to class teaching, such teaching cannot bring about high achievement without the students (Akpan, 1996). The teacher must be familiar with present knowledge regarding growth in physique, intellect, interest, emotions, attitudes (technological) and character traits of the physics students and the corresponding influences of these factors on students' achievement in physics.

It is therefore on the basis of the above views and findings that this study is undertaken to find out the effects of technological attitude of students on academic achievement of senior secondary school physics students in selected schools in Eket Local Government Area of Akwa Ibom State, Nigeria.

### **Statement of Research Problem**

In spite of the great emphasis on physics teaching because of its central role in technological advancement, students are observed to do poorly in academic achievement in the subjects. Many factors have been attributed to this ugly and unwholesome situation. These factors include poor teaching methods, lack of instructional materials, lack of functional, laboratories, poor students' technological attitude and lack of qualified physics teachers. Many research studies have been carried out on other factors mentioned except technological attitude whose empirical data are very few to base advisory role upon. This is the gap that this study is conceived to fill.

### **Purpose of the Study**

The purpose of this study is to:

1. assess the effect of technological attitude on academic achievement of students in secondary school physics,
2. determine the effect of gender on academic achievement of physics students, giving their technological attitude,
3. determine the difference in physics achievement between technical and grammar schools, giving technological attitude.

### **Significance of the Study**

This study is significant as follows:

1. The findings of this study are expected to address the cause of poor achievement of students in secondary school physics.
2. The study is also expected to provide teachers and school counselor's empirical data to base their advisory role upon.

### **Research Questions**

The following research questions were posed:

1. Is there any significant difference in physics achievement between students with positive technological attitude and their counterparts with negative technological attitude?
2. Is there any significant difference in physics achievement between male and female students with positive technological attitude?
3. Is there any significant difference in physics achievement between students in Technological and grammar schools with respect to technological attitude?

### **Research Hypotheses**

The following null hypotheses were stated and used in the study:

1. There is no significant difference in physics achievement between students with positive technology attitude and those with negative technological attitude.
2. There is no significant difference in physics achievement between male students with positive technological attitude and their female counter parts.

3. There is no significant difference in physics achievement between students in technical and grammar schools, giving positive technological attitude.

### **Methodology**

Random sampling technique was used in selecting four co-educational grammar schools (2 each) from urban centres of Uyo and Abak Local Government areas of Akwa Ibom state. Two Technical Secondary Schools (one each) from the same urban centres were also selected. All Senior Secondary Two (SS2) physics students in the schools selected formed the sample. These urban centres where Technical Secondary Schools are located in the state. This gave the sample size of 110 physics students. Sixty of the samples were boys while 50 were girls.

Two researchers-made instruments, Students' Attitude towards Technology Questionnaire (SATTQ) and Physics Achievement Test (PAT) were used in collecting the data. Students' Attitude towards Technology Questionnaire sought information from the respondents' knowledge in technology. It was an instrument to identify the respondents with skills in technology and those with no technological skills. It was a twenty item questionnaire.

Physics Achievement Test (PAT) was a twenty item test. The questions were drawn from physics concepts in SS2 syllabus taught in all schools chosen for the study.

A 4 point likert scale of strongly agree (SA), Agree (A), Disagree (D) and strongly disagree (SD) was used in scoring the items on the questionnaire. Strongly Agree (SA) was scored 4 point, Agree (A) was scored 3 points, Disagree (D) was scored 2 points while strongly disagree was scored 1 point. The mean score of each respondent on the items was computer thus:

$$\frac{4+3+2+1}{4} = \frac{10}{4} = 2.5$$

The minimum mean score of a respondent was 1 point while the maximum was 4 point. A respondent who scored 2.5 points and above was classified as having positive technological attitude. Similarly, a respondent who scored below the 2.5 mean was classified as having negative technological attitude.

This was a twenty item test. Each item earned 5 points and the maximum score on the test was 100%. The scores of respondents with positive

technological attitudes were then compared with those with negative technological attitude, giving their gender and type of school attended.

The content of the instruments were validated by the researcher's colleagues in the university and physics teachers from different secondary schools. Their comments and corrections were greatly considered and incorporated into the final form of the instruments before they were administered on the pilot sample of 25 Senior Secondary Two (SS2) physics students randomly drawn from the target population who were not part of the sample for the study. Their reliability coefficients were determined using Kuder Richardson formula 21 (KR-21) and the reliability indices were 'students', attitude towards technology questionnaire, 0.74 and physics achievement test, 0.86

The researcher administered the instruments directly on the respondents in their normal class room setting.

The data obtained were analyzed using t-test statistics at .05 level of significant.

## **Results**

### **Hypothesis 1**

This hypothesis states that *there is no significant difference in physics achievement between the students with positive technological attitude and those with negative technological attitude.*

The result as shown in Table 1 indicated that the calculated t-value (4.85) exceed the critical t-value (1.96) at .05 alpha level of significant. This implies that hypothesis one is rejected. This means positive technological attitude of physics students significantly influences their achievement in the subject.

### **Hypothesis 2**

This hypothesis states that *there is no significant difference in physics achievement between male students with positive technological attitude and their female counterparts with positive technological attitude.*

The result in Table 2 showed that the t-calculated (5.82) exceeded the critical t-value (1.99) at .05 alpha level of significant. This implies that hypothesis two is rejected. The conclusion on this result is that gender has significant effect on physics achievement of physics students, giving technological attitude.

### **Hypothesis 3**

This hypothesis states that *there is no significant difference in physics achievement between students in Technical and Grammar schools; giving technological attitude.*

From Table 3, the t-calculated (8.79) exceeded t-critical value (1.99) at .05 alpha level of significant. This means that hypothesis three is rejected. This implies the achievement of physics students in Technical Secondary School is better than their counterparts in Grammar Schools with respect to their technological attitude.

### **Discussion**

The results in Tables 1, 2 and 3 confirmed significant effects of technological attitude, gender and type of school of students on their achievement in Physics. This result is because students with positive technological attitude have higher psychomotor skills than their counterparts with negative technological attitude. The result is also because male students are proved through research to have a higher manipulative ability than their female counterparts. Furthermore, Technical school students are better exposed to scientific equipment right from their first year in school than students in Grammar schools who are known to have exposures to apparatus in their final year when they take external examination. These results are in agreement with the works by Akpan (1996), Ndelilie (2004) and Black (1996).

### **Conclusion and Recommendation**

The results obtained show that:

1. Technological attitude of physics students significantly affect their achievement in the subject.
2. Gender affects significantly physics students' achievement, giving their technological attitude
3. Type of school attended by students significantly affects students' achievement in physics, giving their technological attitude.
4. Technological attitude of students should be seen as major factor that leads to higher achievement in the development and implementation of physics curriculum.

Table 1: t-test Analysis of the Effect of Technological Attitude on Physics Students' Achievement

Sources of Variation	N	B	S	df	t-cal	t-crit	P<.05
Physics students with positive technological attitude	80	67.63	3.72	108	4.85	1.96	*
vs Those with negative technological attitude	30	52.10	3.57				

\* = significant at  $p < .05$

Table 2: Effect of Gender on Physics Achievement, Giving Technological Attitude

Sources of Variation	N	B	S	df	t-cal	t-crit	P<.05
Male physics students with positive technological attitude	60	66.10	2.92	78	5.82	1.99	*
vs Female physics students with positive technological attitude	20	51.20	2.68				

\* = significant at  $p < .05$

Table 3: T-test analysis of the difference in physics achievement between technical and Grammar schools, giving technological attitude.

Sources of Variation	N	B	S	df	t-cal	t-crit	P<.05
Physics students from technical schools with positive technological attitude	28	65.80	2.82	78	8.79	1.99	*
vs Physics students from Grammar schools with positive technological attitude	52	50.50	2.57				

\* = significant at  $p < .05$

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