Attitude as Correlate of Students Academic Achievement in Mathematics at the Senior Secondary School Level in Delta State.

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Abstract

This study examined attitude as correlate of student’s academic achievement in mathematics at the senior secondary school level in Ukwuani Local Government Area of Delta State, Nigeria. The study employed survey research design. The sample for the study comprised of three hundred and sixty (360) SS2 and SS3 students randomly selected from ten (10) Public Secondary Schools in Ukwuani Local Government Area of Delta State. The instruments used were Students Attitude Towards Mathematics Questionnaire (SATMQ) and Mathematics Achievement Test (MAT). The mean and standard deviation were used as the descriptive statistics while the pearson’s r inferential statistics were used to analyze the data collected. Three hypothesis were tested at 0.05 level of significance. The result revealed that; there is a positive significant relationship between students attitude towards mathematics and students academic achievement in mathematics. There is a positive significant relationship between attitude of male students towards mathematics and students academic achievement in mathematics. There is a positive significant relationship between attitude of female students towards mathematics and students academic achievement in mathematics. Considering the central role of attitude in students academic achievement, it was recommended among others: teachers should help foster in students positive attitude towards mathematics that helps to build confidence in students. Parents should encourage and sustain positive attitude towards mathematics in their children by providing the necessary materials for learning mathematics and ensuring that the home is conducive for learning.

Keywords: Attitude, Mathematics, Achievement, Correlate.

BACKGROUND TO THE STUDY

Mathematics is the oldest of all sciences that have developed through the ages having a direct impact on the quality of human life on our planet. It is unanimously agreed that mathematics is the language of science and technology and also in some other disciplines like art and culture, holding the key to development and progress of the country as well as humanity as a whole. In elementary stage, the base on mathematics should be imposed to develop mental observation and creativity or innovativeness. According to Ezeweani [2006] the competence gain in the study of mathematics is widely used in all spheres of human life. Mathematics play a key role in shaping how individuals deal with the various spheres of private, social and civic life. This justifies the
compulsion of the study of the subject by all students who go through basic and secondary education in most countries particularly Nigeria. It is regrettable, therefore, that in the contemporary times many students struggle with mathematics and perform abysmally low in their examinations in school. It has been realized that many students have developed negative attitude towards the study of mathematics as a result of mass failure of students in the subject. It is an irrefutable fact that the successfulness of learning mathematics is contingent on a myriad of factors, school, classroom, student and teacher factors all impinge on the learning of mathematics.

Educational researches have expended time and energy trying to unravel the possible causes of students poor attitudes and performance in mathematics. Research findings according to Yara [2009] indicates that effective teachers facilitate learning by truly caring about their students engagement and creating the right atmosphere that enhances students learning. According to Watson [2002], they have high yet realistic expectations about enhancing students capacity to think, reason, communicate, reflect upon and critique their own practice and they provide students with opportunity to ask why the class is doing certain things and with what effect. The relationships that develop in classroom become resource for developing students attitudes and mathematical competencies and identities.

Attitude as a concept is concerned with an individual’s way of thinking, acting and behaving. It has very serious implications for the learner, the teacher, the immediate social group with which the individual learner relates and the entire school system. Attitudes are formed as a result of some kind of learning experiences students go through. As stated by Yara [2007], attitude in this respect avails the learner the opportunity to draw from his teacher’s disposition to form his own attitude, which may like affect his learning outcomes. Yara [2009] also avers that teachers with positive attitudes towards mathematics were explained to stimulate favourable attitude in their students. This immediately puts the teacher in the spotlight as one whose attitude, expressed in their behavior has a telling effect on students.

Mohammed and Waheed [2011] in their work aimed at understanding attitudes and the influences on the their development in relation to difference between students, identified three groups of factors that play vital role in influencing students attitudes; factors associated with the students themselves [for example, mathematical achievement, anxiety, self efficacy and self-concept, motivation and experiences at school], factor associated with the school, teacher and teaching [for example, teaching materials, classroom management, teachers knowledge, attitude towards mathematics, beliefs), and finally factors from the home, environment and society [examples include educational background, parental expectations].

Resulting from these observations, this study is geared towards looking at attitudes as correlate of students academic achievement in mathematics at the senor secondary school level. Since attitude may vary according to a lot of factors, the researcher will want to find out how various attitudes impact or students achievement in mathematics.

**Statement of the problem**

There is a general consensus among educators that mathematics is an important and user subject for the development of every country. Despite it’s importance and influence, it is a subject most feared by students of the primary and secondary levels of Nigeria’s
educational system. Students are seen to develop unwholesome attitudes towards the subject and the teacher, lack of interest in class activities and non-compliance to assignment. Therefore, this study aims at investigating attitude as correlates of student academic achievement of students in mathematics.

**Research Questions**

This study sought to answer the following research questions.

1. What relationship exist between students attitude towards mathematics and their academic achievement?
2. What relationship exist between students attitude toward the mathematics teacher and their academic achievement of students?
3. Does gender affect attitude or the academic achievement of students in Mathematics?

**Hypotheses**

Three null hypotheses were also postulated and tested.

**Ho:** There is no significant relationship between attitude of students towards mathematics and students academic achievement in mathematics.

**Ho2:** There is no significant relationship between the attitude of male students towards mathematics and their academic achievement in mathematics.

**Ho3:** There is no significant relationship between the attitude of female students towards mathematics and their academic achievement in mathematics.

**Method**

**Research Design**

The study adopted the survey design since it is a correlational study. According to Anderson (1998) correlational studies investigate a number of variables believed to be related to an important variable (achievement).

**Population and Sample of the study**

The population included mathematics students at the senior secondary level (SS II – SS III only) in the public secondary schools in Ukwuani Local Government Area of Delta State. The sample was taken from ten (10) schools from which 360 students in SS II and SS III. The simple random sampling was used for making this selection.

**Research instruments**

Two instruments were used for collecting data for this study. The first instrument is the student attitude towards mathematics questionnaire (SATMQ) which was divided into three sections (student attitude to mathematics, students attitudes towards the mathematics teacher and students attitude on the basis of gender). It is a 14 item questionnaire with four possible answers for each using a four possible answer. The second instrument is the mathematics achievement test (MAT) which is a 50 item multiple choice objective test adapted from the May/June 2013 West African Examination Council (WAEC) objective test. In order to maintain anonymity, each student was assigned a number so that scores between the two data collected can be correlated.

**Validity and Reliability of instruments**

The content and face validity of the instruments were determined by two experts in the department of curriculum and integrated science, Delta State University, Abraka. The instruments were revised using suggestions made by the experts. A pilot study was conducted on two schools to establish the reliability of the instruments. A total of 50 mathematics students (13.86%) of the total respondents were used.

**Method of data collection**
An authorization letter was obtained from the department of Curriculum and Integrated Science, Delta State University, Abraka, Delta State before embarking on data collection. In administering the instruments, personal visits was made to the principals of the schools. The researchers administered SATMQ and MAT with the help of the heads of mathematics departments in the schools.

**Method of data Analysis**

**Table 1:** Correlation between attitude towards mathematics and achievement in mathematics

<table>
<thead>
<tr>
<th>Variables</th>
<th>No of student</th>
<th>X</th>
<th>Y</th>
<th>X²</th>
<th>Y²</th>
<th>XY</th>
<th>r</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>360</td>
<td>4612</td>
<td>62926</td>
<td></td>
<td></td>
<td>190180</td>
<td>0.2699</td>
<td>Positive</td>
</tr>
<tr>
<td>Achievement</td>
<td>360</td>
<td>14392</td>
<td>695668</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: shows that the value of the correlation coefficient (r) is 0.2699. This shows that there is a positive relationship between students’ attitude towards mathematics and their academic achievement.

**Research Question II:** What relationship exist between students’ attitude towards their mathematics teacher and their academic achievement.

**Table II:** Correlation between attitude towards mathematics teacher and students academic achievement.

<table>
<thead>
<tr>
<th>Variables</th>
<th>No of student</th>
<th>X</th>
<th>Y</th>
<th>X²</th>
<th>Y²</th>
<th>XY</th>
<th>r</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude towards the teacher</td>
<td>360</td>
<td>4686</td>
<td>64726</td>
<td></td>
<td></td>
<td>192180</td>
<td>0.2287</td>
<td>Positive</td>
</tr>
<tr>
<td>Achievement</td>
<td>360</td>
<td>14392</td>
<td>695668</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table II shows that the correlation coefficient (r) is 0.2287 which indicates that there is a positive correlation between student’s attitude to the mathematics teacher and students’ academic achievement.
Research question III: Does gender affect the attitude or the academic achievement of students in mathematics?

Table II: Group Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>Male</td>
<td>180</td>
<td>13.14</td>
<td>2.2958</td>
<td>0.1711</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>180</td>
<td>12.4</td>
<td>2.2530</td>
<td>0.1657</td>
</tr>
<tr>
<td>Achievement</td>
<td>Male</td>
<td>180</td>
<td>40.21</td>
<td>17.32</td>
<td>1.2910</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>180</td>
<td>39.66</td>
<td>18.71</td>
<td>1.3946</td>
</tr>
</tbody>
</table>

From the group statistics in table III the mean attitude score for male is 13.14 and the mean attitude score for female 12.14. This shows that male students possess more positive attitude towards mathematics than girls. This made the mean achievement score for the males (40.21) to be higher than the female achievement score of girls (39.66) a little bit. This indicates that the more positive altitude an individual develops the more he succeeds in mathematics.

Hypothesis I: There is no significant relationship between the attitude of students towards mathematics and their academic achievement in mathematics.

Table IV: Pearson’s correlation coefficient (r) of students’ attitude and their academic achievement in mathematics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>r</th>
<th>Significance (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students Attitude</td>
<td>360</td>
<td>12.81</td>
<td>2.2776</td>
<td>0.2699</td>
<td>0.0000</td>
</tr>
<tr>
<td>Mathematics achievement</td>
<td>360</td>
<td>39.98</td>
<td>17.93</td>
<td>0.2699</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

*P <0.05 level of significance

Table IV reveal that there is a positive relationship between students’ attitude towards mathematics and their academic achievement in mathematics. Also the relationship is significant since r = 0.2699, P < 0.05 that is P < α which clearly shows there is a positive significant relationship between students’ attitude and their academic achievement in mathematics.

Hypothesis 2: There is no significant relationship between the attitude of male students towards mathematics and the academic achievement of students in Mathematics.

Table V: Pearson correlation of attitude of male students and their academic achievement in mathematics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>r</th>
<th>Significance (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male altitude</td>
<td>180</td>
<td>13.14</td>
<td>2.2958</td>
<td>0.2734</td>
<td>0.0002</td>
</tr>
<tr>
<td>Mathematics achievement</td>
<td>180</td>
<td>40.21</td>
<td>17.32</td>
<td>0.2734</td>
<td>0.0002</td>
</tr>
</tbody>
</table>

*P <0.05 level of significance
From Table V, there exist a positive relationship between attitude of male students and their academic achievement in mathematics. Also the relationship is statistically significant since for $r = 0.2734 \ P < 0.05$. Hence there is a positive significant relationship between the attitude of male students towards mathematics and their academic achievement in mathematics.

**Hypothesis 3**: There is no significant relationship between the attitude of female students towards mathematics and their academic achievement in mathematics.

Table VI: Pearson’s $r$ of attitude of female students and their academic achievement in mathematics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>r</th>
<th>Significance (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female altitude</td>
<td>180</td>
<td>12.4</td>
<td>2.2530</td>
<td>0.2775</td>
<td>0.002</td>
</tr>
<tr>
<td>Mathematics achievement</td>
<td>180</td>
<td>39.66</td>
<td>18.7121</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P <0.05 level of significance

The result in table VI shows that for $r = 0.2475, \ P < 0.05$. This indicates that a positive significant relationship exist between attitude of female students towards mathematics and their academic achievement in mathematics.

**Discussion**

From the result in table IV, a positive significant relationship exist between students attitude towards mathematics and student’s academic achievement in mathematics. This is consistent with the work of Mahmood and Ismail (2011), Cox (2010), and Yara (2009). Students may develop either positive or negative attitude towards mathematics and this has a far reaching effect on students’ achievement in Mathematics.

According to results in table V and VI, gender had a significant effect on students’ academic achievement. Boys tend to develop more positive attitude towards mathematics is a male dominated domain. This result is in consonance with Cox (2010) who discovered that students particularly females with negative altitude score poorly.

**Summary of findings**

Based on the analysis and results obtained, the following are the major findings of this study.

1. There is a positive significant relationship between the attitude of students towards mathematics and their academic achievement in mathematics.
2. There is a positive significant relationship between the altitude of male students towards mathematics and their academic achievement in mathematics.
3. There is a positive significant relationship between the attitude of female students towards mathematics and their academic achievement in mathematics.

**Conclusion**

Based on the research findings the following conclusions were made.

- Attitude towards mathematics is a major determinant of students’
academic achievement in mathematics. It is important to know that despite the low achievement of students in Ukwuani Local Government Area of Delta State, a positive significant relationship between their attitude towards mathematics and achievement in mathematics was detected.

- The personality of the teacher determines the type of attitude students will develop towards the teacher and towards mathematics thereby influencing students academic achievement in mathematics.
- The sex of students helps to shape their attitude towards mathematics. A positive significant relationship was detected between male and female attitude towards mathematics and their academic achievement in mathematics in mathematics.

Recommendation

The researchers made the following recommendations after a careful observation of the result of this study.

- There is need for mathematics teachers to help foster in students, positive attitudes towards mathematics that helps to build confidence by encouraging the belief that everyone can do mathematics thereby discouraging Phobia among students.
- The parent teacher association, Philanthropist and the Government should boost the achievement of students by building mathematics laboratories and providing library facilities in schools.
- There is need for parents to encourage and sustain positive attitude towards mathematics in their children by providing the necessary materials for learning mathematics and ensuring that the home is conducive for learning.
- Curriculum planners should ensure that they plan the curriculum so as to eliminate certain elements that makes mathematics look abstract and confusing.

References


