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A Comparison of Students' Attitudinal Variables towards Mathematics between Private and Public Senior Secondary Schools

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Abstract

The study investigated a comparison of students' attitudinal variables towards Mathematics between Private and Public Senior Secondary Schools Two (SS II) in Ado-Ekiti, Ekiti State, Nigeria. Four hundred students were randomly selected and twenty (20) students were purposively selected from twenty (20) schools which comprised of Ten (10) schools each from Private and Public schools. Two general questions were formulated and answered descriptively while four hypotheses in the study were tested using t-test statistic. The results showed that, most teachers in the sampled schools were teaching Mathematics without audio-visual materials that could arose the interest and attitude of students towards Mathematics. There was no significant difference in the interest and attitude of students towards mathematics in private and public school while significant difference existed between the attitude of male and female students and also between the attitude of teachers in private and public schools at $p<0.05$. The study recommended that female students' interest and attitude should be geared towards mathematics through regular advise by the Mathematics teachers while public schools teachers should be motivated through the State Ministry of Education to the State Government by increasing the Mathematics teachers' allowance. This may improve the morale towards the teaching of Mathematics in Public schools in the State and Nigeria as a whole.

Keywords: Attitude, Interest, Students, Teachers, Private and Public Schools.

Introduction

Mathematics is the base in which technology is built. Ojerinde (1999) argued that Mathematics is a tool for use in Science Technology and in industries, a language of all disciplines; technology stands out in its utilization. Mathematics– a specialized cognitive tool– is an undisputed agent of nation's development and wealth creation. Its application is universal to all learning and everyday living from counting possession to measuring properties, predicting events, computing taxes/profits, drawing maps/plans, planning budget or warfare, providing models, synthesizing results. All these are indication that Mathematics is useful in domestic and business deals, scientific discoveries, technological breakthrough, problem solving and decision making in different situations in life (Kolawole and Oluwatayo, 2005; Harbor Peter, 2000). Actually, mathematics is a key to productive and fulfilling life and is a big servant to humanity.

The significance, relevance and usefulness of mathematics can never be over-emphasized. It permeates all aspect of human endeavour (Abe and Egbon, 2012). Okereke (2006) argued that, the functional role of Mathematics to Science and technology is multifaceted and multifarious that no area of science, technology and business enterprise escapes its application. Contributing on this,

Adetula (1983); Adeniran (2006); Ale and Adetula (2009) succinctly pointed out that the knowledge of mathematics will help Nigeria to:

- Produce citizens that can manufacture raw materials, machines and tools needed for our industries (gas and oil inclusive), and bridge/dam, road and building constructions.
- Invent new design and focus on the need for more investment in Research and Development (R & D).

That is why there is more emphasis on mathematics as a core subject in the primary and secondary level of education in Nigeria (Federal Government of Nigeria (FGN), 2004) In spite of the importance of mathematics, students exhibit negative attitude towards it. Mcleod (1992) and Aiken (2000) posited that, attitude is a positive or negative emotional disposition. Bohner and Wanke (2002) argued that, attitude is a summary evaluation of an object of thought, it is the central part of human identity, human love, hate, favour, oppose, like, dislike, agree, and disagree among others. All these are evaluative responses to an object or a situation. Attitude can alter every aspect of a person's life, including their career.

Akinsola and Olowojaiye (2008), Ma and Kishor (1997) argued that attitudes towards mathematics is an aggregate measure of liking or disliking of mathematics, a tendency to engage in or avoid mathematical activities, a belief that mathematics is useful or useless. Attitude towards mathematics is just a positive or negative emotional disposition towards mathematics (Zan and Martino2007). Students' attitude towards mathematics is a major factor that influences students' choice of achievement in the subject. Several studies have been conducted in different countries in order to find out the students' attitude towards mathematics (Tahor, Ismail, Zamani and Adam, 2010; Tezer and Karasel, 2010; Maat and Zakaria, 2000). Students have different attitude towards mathematics. More often, the public regard mathematics as a difficult, cold, abstract, theoretical and ultra-rational subject (Ernest, 2004). Mathematics has been one of the subjects which Nigerian students especially at secondary school level develop dislike for and likewise achieve poorly most especially, the female students (Odili, 2006).

Girls are negatively influenced by their sex-role stereotypes (Fennema and Sherman, 1977; Sherman, 1982; Leder, 1982; and Ethinglon, 1992). To Fennema and Sherman (1977) and Hyde, Fennema, Ryan, Frost and Hopp (1990), mathematics and science are stereotyped as male dominates. Sometimes even teachers tend to stereotype mathematics as a male domain. In particular, they overrate boys' ability relative to girls in mathematics (Helwig, Anderson and Tindal, 2001).

Statement of the Problem

In spite of all the available qualified and trained teachers as well as multiple examinations at the disposal of secondary schools students, most of the students were unable to secure admission into tertiary institutions due to their inabilities to pass mathematics at credit level.

The following general questions arise from this statement of the problem.

(i) What is the state of personal interest of students towards learning of mathematics?
(ii) How does teachers' attitude affects students' personal interest towards mathematics?

Purpose of the Study

The purpose of the study therefore is to investigate the attitudinal variable related to students' performance in mathematics between private and public schools in senior secondary schools in Ado Local Government Area of Ekiti State, Nigeria.

Research Questions

From the purpose of the study above, the following four research questions were generated for this study.

(1) Is there any significant difference between the attitude of students in private and public schools towards mathematics?
(2) Is there any significant difference between the interest of students in private and public schools towards mathematics?

(3) Is there any significant difference between the attitude of male and female students towards mathematics?

(4) Is there any significant difference between the attitude of teachers in private and public schools towards mathematics?

Hypotheses

The following four hypotheses were formulated to guide the study from the research questions above.

1. There is no significant difference between the attitude of students in private and public schools towards mathematics.
2. There is no significant difference between the interest of students in private and public schools towards mathematics.
3. There is no significant difference between the attitude of male and female students towards mathematics.
4. There is no significant difference between the attitude of teachers in private and public schools towards mathematics.

Methodology

The study is descriptive research of survey type which involved strictly the "comparison of students' attitude and interest towards mathematics among the senior secondary schools two (SS II) student in private and public schools in Ado Local Government of Ekiti State". It is a survey type which aimed at collecting data on and describing in a systematic manner the characteristics, features or facts about a given population (Champion, 1970; Nworgu, 1991, 2006; Gay 1996; Adeyemi, 2007; Abe, 2014).

Population

The target population for the study consisted of all public and private secondary schools in Ado Local Government Area of Ekiti State totaled fifty eight (58) secondary schools which comprises of thirty two (32) private and twenty six (26) public secondary schools.

Sample and Sampling techniques

A sample of four hundred (400) students was randomly selected from twenty (20) senior secondary schools two (SS II) students in twenty schools (20) purposively selected from the fifty eight secondary schools. That is, ten (10) schools each were purposively selected from private and public schools.

Instrumentation

The instrument for the study was a five scale questionnaire designed by the researcher based on some attitudinal variable of students towards the learning of mathematics. The face and content validities were ascertained by three Lecturers from Mathematics departments, College of Education, Ikere-Ekiti and it was re-presented to two test and measurement experts from the Institute of Education, Ekiti State University, Ado-Ekiti. While the construct validity and reliability was determined by the researcher using alpha Cronbach the result of the estimate was 0.70 and this index is considered high and significant enough for this kind of study and it corroborate with the Macintosh (1974) and Alonge (1989, 2014) who argued that reliability coefficient of any instrument should range between 0.50 – 0.85 and above. With the assistance of the various Mathematics teachers whose classes were used for the study mostly from twenty sampled schools, the completed questionnaire were collected from the respondents and coded and analyzed accordingly with the aid of computer assistance. There was no report of any loss of questionnaire. With this, 100% return rate was achieved.

Data Analysis

The data collected were analyzed descriptively to answer the two general questions while t-test statistic was used to test the four hypotheses formulated at 0.05 level of significance using SPSS 2012 version.

Results and Discussion

This section explains the descriptive analysis and the hypotheses using percentages and t-test statistic. While percentages proffer answers to the items of the questionnaires given to the respondents in the field, t-test statistic was used to test the four hypotheses formulated at $p < 0.05$.

Question One

What is the state of students' personal interest towards the learning of Mathematics?

Table 1: Showing the State of Students' Personal Interest Towards Mathematics

S/N	ITEMS	SA	A	U	D	SD	REMARKS
1.	I like Mathematics	194 (49%)	80 (20%)	12 (3%)	56 (14%)	58 15%)	SA
2.	Mathematics is an interesting subject	166 (42%)	106 (21%)	30 (8%)	52 (13%)	46 (12%)	SD
3.	I enjoy mathematics class	180 (45%)	90 (23%)	18 (5%0	54 (14%)	58 (15%)	SA
4.	I fell happy anytime our mathematics teacher gives us assignment in mathematics	170 (34%)	94 (24%)	26 (6.5%)	56 (14%)	54 (13.5%)	SA
5.	I always practice solving problems on mathematics at home	138 (356%)	116 (21%)	48 (12%)	36 (9%)	62 (16%)	SA
6.	I have never like mathematics because it is too difficult	96 (24%)	76 (19%)	28 (7%)	76 (19%)	124 (31%)	SD
7.	Mathematics is major problem I don't like it	66 (17%)	112 (28%)	26 (7%)	90 (23%)	106 (27%)	A
8.	I like my mathematics teacher	148 (37%)	146 (36%)	32 (8%)	34 (8.5%)	40 (10%)	SA
9.	Lack of time to do mathematics as discouraged me from mathematics	68 (17%)	92 (23%)	52 (13%)	54 (12%)	104 (26%)	SD
10.	My parents encourages me to study mathematics	156 (39%)	122 (31%)	48 (12%)	42 (11%)	32 (8%)	SA
11.	My position in the family affect my intention in the study of mathematics	76 (19%)	96 (24%)	44 (11%)	70 (18%)	114 (29%)	SD
12.	Majority of our family members don't have interest in mathematics	42 (24%)	80 (20%)	36 (9%)	88 (22%)	100 (25%)	SD
13.	It is easy to pass mathematics	128 (32%)	94 (24%)	36 (9%)	48 (13%)	94 (20%)	SA

The table 1 above revealed that the respondents indicated Strongly Agreed to items 1, 2, 3, 4, 5, 8, 10 and 13 and Agreed to item 7 while the respondents opinion was based on Strongly Disagreed to items 6, 9, 11 and 12.

Question Two

How does teachers' attitude affect students' personal interest towards mathematics?

Table 2: Showing how teachers' attitude affects students' personal interest towards mathematics.

S/N	ITEMS	SA	A	U	D	SD	REMARKS
1.	My Mathematics teacher is generally fast when teaching, he does not give enough explanation	60 (15%)	96 (24%)	58 (15%)	54 (15%)	128 (31%)	SD
2.	My mathematics teachers encourage my interest in the subject by passing me	132 (33%)	118 (30%)	38 (9.5%)	52 (13%)	60 (14.5%)	SA
3.	My mathematics teacher discourage me from studying the subject by regular flogging when	70 (18%)	102 (26%)	38 (9.5%)	74 (18.5%)	116 (29%)	SD

	I perform poorly						
4.	My mathematics teacher likes the subject but there is no enough time for it	74 (19%)	64 (16%)	46 (11%)	64 (16%)	152 (38%)	SD
5.	My mathematics teacher makes use of audio-visual aid to teach mathematics	42 (11%)	20 (5%)	26 (6%)	60 (15%)	252 (63%)	SD

Table 2 showed that, the respondents' opinion on items 1, 3, 4 and 5 was Strongly Disagreed while only item 2 was Strongly Agreed as indicated by the respondents.

Hypotheses Testing

Ho_1: There is no significant difference between the attitudes of students in private and public schools towards mathematics.

Table 3: t-test analysis of attitudes of students in private and public schools towards mathematics

Type of School	N	Mean	SD	Df	t_{cal}	t_{tab}	Decision
Private	200	65.9	16.5	398	1.32	1.96	NS
Public	200	63.4	9.8				

Not significant at P<0.05, NS = Not Significant.

The mean attitude of students in private schools was (65.9) which was higher than mean of students in public schools (63.4) with a mean difference of (2.5). The t-test analysis revealed that $t_{(cal)}$ (1.32) was less than the $t_{(tab)}$ (1.96) at P < 0.05. This implies that, there was no significant difference between the attitude of students' towards mathematics hence the Null hypothesis was upheld.

Ho_2: There is no significance difference between the interest of students in private and public schools toward mathematics.

Table 4: t-test analysis of students' interest in private and public schools towards mathematics.

Type of Schools	N	Mean	SD	Df	t_{cal}	t_{tab}	Decision
Private	200	48.4	12.6	398	1.28	1.96	NS
Public	200	46.5	8.2				

At P<0.05, NS = Not significant.

From table 4, the mean interest score of students in private school (48.4) was higher than the mean interest of students in public school (46.5) with a mean difference of (1.9). The t-test analysis revealed that $t_{(cal)}$ (1.28) was less than t_{tab} (1.96) which showed that there was no significant difference in the students' interest towards mathematics in private and public schools hence the Null hypothesis was upheld.

Ho_3: There is no significant difference in the attitude of Male and Female students in both private and public schools towards mathematics.

Table 5: t-test analysis of attitude of Male and Female students in both private and public schools towards mathematics.

Variables	N	Mean	SD	Df	t_{cal}	t_{tab}	Decision
Male	204	67.03	13.9	398	*2.54	1.96	S
Female	196	62.22	12.9				

At P < 0.05, *S = Significant.

From the table 5, the mean of attitude score of Male (67.03) was greater than the mean attitude of Female (62.22) with a mean difference of (4.91). The t-test analysis showed that t_{cal} (2.54) was greater than t_{tab} (1.96) at P < 0.05, which implies that, there was significant difference in the attitude

of Male and Female students towards mathematics in both private and public secondary schools. Hence, the null hypothesis was not upheld at $P < 0.05$.

Ho4: There is no significant difference between the attitude of teachers in private and public schools towards mathematics.

Table 6: t-test analysis of attitude of teachers in private and public schools towards mathematics.

Type of School	N	Mean	SD	Df	t_{cal}	t_{tab}	Decision
Private	200	20.3	6.6	398	*2.45	1.96	S
Public	200	18.2	5.2				

At $P < 0.05$ *S = Significant

From table 6, the mean score of attitude of private teachers (20.3) was greater than mean score of attitude of public teachers (18.2). With a mean difference of (2.1) the t-test analysis showed that, there was significant difference between the attitude of teachers in private and public schools towards mathematics hence; the null hypothesis was not upheld at $P < 0.05$.

Discussion of Findings

The following were found from the descriptive analysis from tables, most of the respondents showed Strongly Agreed (SA) with (49%) in item 1, 42% in item 2, 45% in item 3, 43% in item 4, 35% in item 5, 37% in item 8, 39% in item 10 and 32% in item 13, indicating that most of the students like mathematics, and it is an interesting subject, students enjoy mathematics class and happy anytime they were given assignment by the mathematics teachers as an indication that, students always practice solving problems in mathematics at home and they like their mathematics teachers in both private and public secondary schools in Ado-Ekiti this corroborate the findings of Ojo (2013), Akinyemi (2010) Maat and Zakaria (2010) but at variance with Aiken (1979), Zan and Martino (2007), Tezer and Karasel (2010) and Tahor et al (2010). Also all the items on teachers', variables in table 2, the respondents indicated Strongly Disagreed to item 1 (31%), item 3 (29%), item 4 (38%) and item 5 63%. The implication of these is that most of the respondents were of the opinion that their mathematics teachers did not make use of audio-visual aid to teach mathematics, and this discourage students from studying mathematics, this also corroborate the findings of Abe (2014), Akinsola and Olowojaiye (2008); Odili (2006) and Okereke (2006).

The study revealed that, at $P < 0.05$, there was no significant difference between the attitude of students in private and public schools towards mathematics but there was variation in mean attitude (2.5), the mean attitude of students in private school was greater than students in public schools. This is also in line with the findings of Ojo (2013), but at variance with Adeyemi (2010), Tezer Okarasel (2010) and Okereke (2006). Also, the mean interest of students in private schools (48.4) was greater than public schools (46.5) the variation of mean was (1.9) very minimal. However, this might be one of the reasons why private students passed more than public students in mathematics at WASCE and NECO examinations this was also supported by the findings of Ojo (2013) and Zan and Martino (2007). The study showed that, at $P < 0.05$, there was no significant difference between the interest of students in private and public schools in Ado-Ekiti, Ekiti State, Nigeria among the Senior Secondary School Two (SSII) this was supported by Zan and Martino (2007) and Tazer and Karasel (2010) but not in line with the studies of Tahor et al (2010), Ojo (2013) and Abe (2014).

Furthermore, significant difference existed between the attitude of Male and Female students toward mathematics at $P < 0.05$. This corroborate the findings of Aiken (1979), Fennema and Sheriman (1977); Ethinton (1992); Bohner and Wanke (2002); Ernest (2004) and Ojo (2013). Finally, at $P < 0.05$, significant difference existed between the attitude of teachers in private and public schools. This was in line with the findings of Zan and Martino (2007), Tahor et al (2010); Tezer and Karasel (2010); Akinyemi (2010) and Ojo (2013).

Conclusion

The study revealed that using of Audio-visual as instructional materials in the teaching of mathematics in both private and public schools was not common or conspicuously absent. Male students showed more interest and attitude towards mathematics than female students and teachers in private schools exhibited more interest and attitude towards mathematics than public schools. Also, the study showed that at $p < 0.05$, significant differences existed between the attitude of teachers in private and public schools, and between the attitude of male and female students in private and public schools in Ado-Ekiti. This might be due to commitment and incessant monitoring of proprietors or proprietress of private schools in Ado Local Government Area of Ekiti State, Nigeria.

Recommendations

Based on the findings of the study, both private and public schools should make provision for audio-visual instructional materials for the teaching of mathematics.

- Female students' interest and attitude should be motivated by regular advice and they should be counsel that mathematics is meant for all students not necessarily male affairs.
- The prominent role mathematics play in technological development of the Nation cannot be under rated; hence the interest and attitude of public teachers should be motivated by the Government through State Ministry of Education.
- Enhanced salary and other emoluments along side with conducive environments should be made available for teachers and students in both private and public secondary schools in the state and by federal ministry of education.

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