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Students' attitude and academic achievement in Mathematics: The case of private and public junior high schools in the Abesim Circuit Schools

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Abstract

The study was conducted to find out the attitude of students towards Mathematics learning and their academic achievement in Mathematics at the Public and Private J.H.S. in the Abesim circuit schools. The study involved 174 B.E.C.E. candidates from three Public and three Private Junior High Schools from Abesim Circuit in the Sunyani Municipality. Mathematics Achievement test and Students' questionnaire were the instruments used to collect data. The data collected were analyzed using Frequency Counts, Percentages, Means and Standard Deviations. The hypotheses raised were tested using the independent samples t-test at 5% significant level. The results showed a significant difference between the attitudes of Private and

Public J.H.S. students' attitude towards Mathematics learning with the Private J.H.S. students exhibiting more positive attitude. The Private J.H.S. students had significantly high achievement than the Public J.H.S. in Mathematics. Mathematics achievement and attitude were closely related variables that play important role in learning mathematics. The researcher had recommended that Mathematics teachers should provide an appropriate conducive environment in which students can learn, appreciate and enjoy the subject. Mathematics teachers should develop positive relationship with students and stress classroom activities that will involve active teaching-learning process and students' participation in the class.

Keywords: Attitude, Mathematics Learning, Basic Education Certificate Examination, Academic Achievement, Junior High school, Private

1. Introduction

Quality in education defines how much and how well children learn and the extent to which their abilities are seen in test grades or job market (Ampiah, 2010) ^[6]. Indeed, access to education of poor quality is equivalent to no schooling. There is no reason of providing the opportunity for a child to enroll in school if the quality of the education is so poor that the child will not become well educated, numerated, or will fail to acquire important life skills (UNICEF).

The increased demands by the people and the limited resources available to the Ghanaian government have made it difficult for the government alone to finance education provision in the country. It has therefore become increasingly necessary for the private sector to get involved in the provision of educational facilities in the country, (Nsiah, 2004) ^[31]. Children of school going age are therefore enrolled either into a public or private school.

This choice of a particular school type by a parent could be influenced by perceived school effectiveness, which is often judged in terms of the number of pupils that pass standardized tests; and there is sufficient evidence from developing countries that suggest that private schools most at times perform academically better than their public-school counterparts in external examinations (Akaguri, 2011) ^[4].

Despite the fact that both private and public schools serve the interest of the Ghanaian populates, there are significant differences between their performances. Public schools provide education to a large segment of the population, and children educated in public schools belong mainly to a poor segment of the society (Khan & Rodrigues, 2012) ^[20]. Public basic schools also have more qualified classroom teachers but lesser opportunities for quality education (NTC, 2017; Student Achievement

Division, 2011). Children who attend private basic schools on the other hand come from wealthier, more highly educated families, and have higher scores on early learning skills than children in public basic schools, (Ball, 2008). Classroom teachers in private schools are less educated and less likely to have early childhood development training, (NTC, 2017).

Moreover, public education in Ghana is however currently be devilled with many problems such as inadequate infrastructure, shortage supply of teaching and learning materials, teacher absenteeism, low student discipline, parental negligence and above all poor academic performance in standard examinations. Parents' explanations of their choice of private basic schools over public ones for their wards include better examination performance and access to higher levels of education (Rolleston & Adefeso-Olateju, 2012)^[37].

The research conducted by CDC Consult Ltd in 2008 and 2009 showed that the average pass rate of the low-income private school pupils in Ghana at the B.E.C.E. were averaged 98% and 96% in 2007 and 2008 respectively compared to the national pass rates of 62.17% and 62.16% within the same period (CDC Consult, 2010)^[12]. In addition, the National Education Assessment Test (NEAT) which was introduced in 2005 to assess the academic achievement of the lower and upper primary pupils in class three and six consistently showed higher academic performance of private school pupils compared with public school pupils in English and Mathematics (Djangmah, 2011)^[15].

Mathematics is one of the important subjects in the list of foundation subjects that constitute the core curriculum for basic education, (Mohammed & Ismael, 2011)^[23]. The basic knowledge acquired in Mathematics at the lower level is vital for a student to progress to upper classes in the senior high schools. Mathematics is a core subject in the Ghanaian schools and occupies a privileged position in the school curriculum, (Eshun, 1999^[16]; MOE, 2007).

In spite of the important roles the knowledge in Mathematics plays in the academic life of pupils, the performance in the mathematics subject by students in both public and private schools is indifferent at the Junior High level, (Kuranchie, Awuah & Konie, 2013). This is mainly associated or ascribed to students' negative attitudes towards mathematics among others and according to Baah-Korang, (2002)^[10], attitude plays an important role in students' academic performance especially in the area of arithmetics.

Students at elementary grade level may or may not have good foundation for Mathematics because there is no one size fits all package for Mathematics education. Different factors can affect how well students grasp mathematical concepts. Most students at the senior high level have trouble with Mathematics than any other subject. This is because Mathematics is a cumulative subject and previously learned mathematics skills are the foundation on which new skills are built. If one fails to understand some mathematics skills today, it will keep him/her from understanding a new skill tomorrow (Andualem, 2006)^[7].

Several studies had been conducted to find out the relationship among students' attitude towards Mathematics, academic achievement of students and factors affecting students learning. Most of these studies showed that there is a positive correlation between students' attitude towards mathematics and academic achievement of students and also in problem solving (Mohamed *et al.*; Nabie, Akayuure &

Sofo, 2013^[29]). Similarly, students' attitude towards problem solving in terms of patience, confidence and willingness had positive relation with students' Mathematics achievement (Mohamed, 2012)^[24].

Also, Basic Education Certificate Examination (B.E.C.E.) which is the main initial formal examination that Junior High School leavers sit in Ghana. The B.E.C.E. results are normally used for certification and selection of the pupils at the basic school level, and also to determine how a child should progress to second cycle schools. The B.E.C.E. therefore provides an excellent opportunity to assess the performance of the basic school system (Oduro, 2000)^[32]. This form of examination helps to determine the individual's academic ability and further reveals how this skill should be progressed on their next stage of educational career.

Available information in the data of schools' performance in B.E.C.E. from the Sunyani Municipal Education Office, (S.M.E.O.) for the past seven years indicate that majority of the candidates from the private schools in the Abesim Circuit schools perform far better in the Mathematics, Science and English Language and for that matter get higher placements into the various second cycle institutions than their public counterparts, (S.M.E.O., 2017). The general perception being held by most stakeholders in this circuit suggest that the academic standards and performance in public basic schools where majority of children receive their education have fallen as compared to their private counterparts.

For instance, in the year 2015, the number of candidates who sat for B.E.C.E. in the circuit was 730 and the number that obtained grades 1 - 6 in Mathematics were 433, representing 61.72% private and 38.28% public. The number that sat in 2016 was 787 and those who obtained grades 1 - 6 in Mathematics were 502 representing 63.31% private and 36.69% public. The trend of performance of the candidates at Mathematics in percentage terms continued to decline at the public junior high schools in 2017 at 35.73% and 2018; 33.59% respectively with the private schools having the greater percentage compared to the number of public junior high schools in the circuit (Data performance in B.E.C.E., S.M.E.O., 2018).

However, as more public basic schools were performing below average in Mathematics in the Abesim Circuit schools, the private basic schools on the other hand, were acclaimed for their outstanding performance in the same examination.

The study therefore seeks to examine the attitude and academic achievement of public and private school students in Mathematics at the Junior High Schools in the Abesim Circuit; Sunyani municipality.

1.1 Objectives of the study and research questions

The research was conducted with the aim of achieving the following objectives;

1. To find out the attitudes of Private and Public Junior High School students toward Mathematics learning.
2. To determine the level of Mathematics achievement at the Private and Public Junior High Schools
3. To investigate whether there is significant difference between the:
 - a) Attitudes of Private and Public Junior High School students toward Mathematics

- b) Achievement of Private and Public Junior High School students in Mathematics?

Based on the stated objectives, the study sought to answer the following questions:

1. What are the attitudes of Private and Public Junior High School students towards Mathematics learning?
2. What is the level of Private and Public J.H.S. students' Mathematics achievement?
3. Is there any significant difference between the:
 - a) Attitudes of private and public Junior High School students toward Mathematics?
 - b) Achievement of private and public Junior High School students in Mathematics?

1.2 Hypothesis

The following hypotheses were formulated to guide the study from research question 3:

H₀: There is no significant difference between the:

- a. Attitudes of Private and Public Junior High School students toward Mathematics.
- b. Achievement of private and public Junior High School students in Mathematics.

2. Methodology

Quantitative techniques were employed to meet the stated objectives of the study. These were used to analyze the data gathered through questionnaire and achievement test. Sample of six schools were chosen from the final year students who were presented for the Basic Education Certificate Examination in 2020 academic year. These schools comprised of three public and three private junior high schools. These candidates were selected purposively. Purposive sampling is a type of non-probability sampling in which the researcher carefully and consciously chooses their subjects to be included in their sample so that the sample can be developed for their needs (Alonge 2010) ^[5]. The purposive sampling was adopted by the researcher to ensure

the participation of only final year candidates from the selected schools.

Again, all the 2020 B.E.C.E. candidates from the chosen schools were selected using probability and non-probability techniques. The researcher used proportional quota sampling to determine the number of students to be selected from the strata of schools followed by simple random sampling.

Together, there were 174 sampled respondents (95 students from public J.H.S., 79 students from private J.H.S.). 32, 30 and 33 sampled respondents were taken from schools A, B and C respectively (Public). The private school respondents were D (27), E (29) and F (23).

The instruments used for data collection were Students' Attitudes Towards Mathematics Questionnaire, (SATMQ) developed from Fennema – Shemar Mathematics Attitudinal Scales which consisted 26 items; anxiety, (6); Confidence, (7); Enjoyment, (7) and Benefits, (6) and Students' Mathematics Achievement Test, (SMAT). Cronbach's Alpha reliability scores for the sample in the four attitudinal aspects were adequate as Cronbach's Alpha values ranged between 0.82 and 0.98. These were in agreement with Abe and Gbenro (2014) that the reliability coefficient of instruments should lie between 0.5 and 0.85 or above. Descriptive statistics such as means, standard deviations, percentages, tables, independent sampled t-test and Pearson's moment correlation were used to describe the attitude and the general performance of the respondents.

3. Results and discussion

3.1 What are the attitudes of Private and Public Junior High School students towards Mathematics learning?

The first research question of the study required to establish the students' attitude towards Mathematics learning. Descriptive statistics such as frequency counts, percentages and tables were used.

3.1.1 Students' Response on Mathematics Anxiety

Table 1: Students' Response on Mathematics Anxiety

S. No	Item	N	School Type	Agree N (%)	Disagree N (%)
1	Mathematics is the subject I fear most	174	Private Public	29(16.7) 54(31.0)	39(22.4) 25(14.4)
2	Learning Mathematics is very worrying	167	Private Public	24(14.4) 59(35.3)	42(25.1) 25(15.0)
3	I feel shy when asking Mathematics question in class	172	Private Public	21(12.2) 35(20.3)	49(28.5) 44(25.6)
4	Time for Mathematics questions are very small	174	Private Public	49(28.2) 73(42.0)	15(8.6) 7(4.0)
5	I feel happy when my Mathematics teacher is absent in class	169	Private Public	18(10.7) 52(30.8)	48(28.4) 29(17.2)
6	I get nervous when my Mathematics teacher is in class	171	Private Public	16(9.4) 37(21.6)	44(25.7) 40(23.4)

Source: Author's Construct with field data

From Table 1, majority of the respondents hold high to medium positive attitude to Mathematics learning. Many students from the public schools possessed medium positive attitude towards the learning of the mathematics subject. This is possibly because opportunity to study in the Private Junior High schools is often considered as a rare gift for students in Ghana. Hence students in the Private J.H.S. do have positive attitudes to most institutionalized forms of study, including mathematics (Choudhury & Das, 2012; Mahanta 2014; Mohd & Mahmood, 2011 ^[27]).

Students' response on the mathematics anxiety variable affirms Wei, (2010) that learners feel anxious when confronting Mathematics, show a strong tendency to avoid learning Mathematics and hold negative attitudes towards the mathematics subject. Besides, the finding is indifferent from those of Mato and Torre, (2010), Awuah, (2009) and Nabie, (2002) that positive attitude towards Mathematics leads students towards success in the subject.

One worrying challenge that the findings also revealed on research question 1 was that most of the students from the

Abesim circuit J.H.S. feel shy to ask questions in the mathematics class and this calls for prompt actions to curb it. This finding is in line with Halai, (2010) that Mathematics is a subject which is based on questioning. When students ask questions, the problems which they have may be cleared otherwise all parts of the subject may be like a puzzle which makes the environment of Mathematics less interesting. The result was similar to the work of Latham and Kim, (2011) that self-efficacious students engage more willingly in tasks, persist longer and work harder to accomplish challenging tasks, and experience fewer disturbing emotional reactions than those who harbour self-doubt about their capabilities. Also, Ashcraft and Moore (2009) cognitive factors, such as inadequate motivation, low skill or ability in Mathematics, and insufficient working memory, as the risk factors for Mathematics anxiety could lead to performance deficits and avoidance of the subject.

Almost all the respondents unanimously agreed that “time allotted for Mathematics questions were very small”. According to Ashcraft and Moore, (2009), decline in performance occurs when a Mathematics-anxious person is

asked to do Mathematics under timed, high-stakes circumstances. Hence, Mathematics-anxious individuals are underestimated on their true ability in Mathematics achievement and proficiency scores. By implication, the differences in Mathematics achievement among students could sometimes be due to the mathematics anxiety that they experience such as small time allotted for Mathematics test questions rather than their varying levels of potential and ability.

The responds to items 5 and 6 on Mathematics anxiety as an attitudinal variable affirmed the works of Blazar and Kraft (2017)^[11] who found that emotional support was associated with an increase in students’ self-efficacy in Mathematics and their happiness in class. They discussed further that by providing emotional support and a predictable, consistent and safe environment it could help them become self-reliant, motivated to learn and ready to take risks.

3.1.2 Students’ Response on Confidence in learning Mathematics

Table 2: Students’ Response on Confidence in learning Mathematics

S. No	Item	N	School Type	Agree N (%)	Disagree N (%)
1	Nothing motivates me to study Mathematics	174	Private Public	34(43.0) 36(37.9)	45(57.0) 59(62.1)
2	I have confidence in taking Mathematics test	172	Private Public	45(57.0) 23(25.0)	34(43.0) 69(75.0)
3	My Mathematics teacher actively involves me in Mathematics lessons	170	Private Public	57(60.0) 47(52.2)	22(40.0) 46(47.8)
4	I always solve Mathematics questions before time	172	Private Public	23(29.1) 38(40.9)	56(70.9) 54(59.1)
5	I always depend on my colleagues for correct answers in Mathematics test	174	Private Public	26(32.9) 37(38.9)	53(67.1) 58(61.1)
6	I always score high marks in Mathematics test	174	Private Public	50(71.4) 33(34.7)	29(28.6) 62(65.3)
7	I don't have the confidence to ask question in Mathematics class	174	Private Public	28(35.4) 32(33.7)	51(64.5) 51(66.3)

Source: Author’s Construct with field data

The attitude towards Mathematics in terms of confidence they have in studying the subject, the result in Table 2 shows that the Private J.H.S. students’ confidence in studying Mathematics is consistently higher than their public counterparts. The students from the Public J.H.S. show a comparative lack in personal confidence in the mathematics subject. This is in line with Van der Bergh (2013)^[44] who found a significant influence between self-

confidence and students’ ability to successfully learn and perform well in Mathematics. The study of Syeda (2016)^[40] also supports this finding as it found that despite negative emotions, many students have the confidence to pursue the mathematics subject.

3.1.3 Students’ Response on Enjoyment in learning Mathematics

Table 3: Students’ Response on Enjoyment in learning Mathematics

S. No	Item	N	School Type	Agree N (%)	Disagree N (%)
1	I dislike Mathematics	172	Private Public	21(27.3) 79(83.2)	56(72.7) 16(16.8)
2	I enjoy learning Mathematics with my colleagues	174	Private Public	67(84.8) 70(73.7)	12(15.2) 25(26.3)
3	I practice Mathematics questions at my leisure time	171	Private Public	56(73.7) 49(51.6)	20(26.3) 46(48.4)
4	Mathematics is a boring subject to study	173	Private Public	35(44.9) 57(60.0)	43(55.1) 38(40.0)
5	I wish my Mathematics teacher gives homework everyday	169	Private Public	56(71.8) 36(39.6)	22(28.2) 55(60.4)
6	I am always happy in Mathematics class than in any other class	170	Private Public	55(69.6) 22(24.2)	24(30.3) 69(75.8)
7	Mathematics test questions are more difficult than the other subject test questions	173	Private Public	54(68.4) 65(69.1)	25(31.6) 29(30.9)

Source: Author’s Construct with field data

Again, the results further show that the respondents from the Private J.H.S. enjoy studying the mathematics subject more than the public students as majority of them affirmed the statements relating to the enjoyment, they derived in studying Mathematics. This discloses the fact that whilst attitude to Mathematics enjoyment was consistently high among the Private Junior High Schools, it was consistently less among the Public J.H.S. which is consistent with Mata,

et al. (2012). It is also in line with OECD (2013) [34]; Van der Bergh (2013) [44]; Zakaria and Nordin (2008) [48] who posit that enjoyment as Mathematics attitude is crucial in shaping students' attitudes and consequently their achievement in Mathematics.

3.1.4 Students' Response on Benefit of Learning Mathematics

Table 4: Students Response on Benefit of Learning Mathematics

S. No	Item	N	School Type	Agree N (%)	Disagree N (%)
1	Mathematics is important in everyday life	169	Private	72(94.7)	4(5.3)
			Public	86(92.5)	7(7.5)
2	Mathematics must be an optional subject to study	174	Private	49(62.0)	30(38.0)
			Public	60(63.2)	35(36.8)
3	I don't need knowledge in Mathematics for my future work	173	Private	8(10.3)	70(89.7)
			Public	66(69.5)	29(30.5)
4	Mathematics helps people to make good decision in life	174	Private	73(92.4)	6(7.6)
			Public	59(62.1)	36(37.9)
5	Mathematics improves my thinking ability	172	Private	65(83.3)	13(16.7)
			Public	59(62.8)	35(37.2)
6	Mathematics is not important to study other subjects	171	Private	10(12.7)	69(87.3)
			Public	22(23.9)	77(76.1)

Source: Author's Construct with field data

The last attitudinal variable under research question 1 was benefit in learning Mathematics. Though almost all the students from the two group of schools believe that Mathematics is important in all endeavors, the Private J.H.S. students see it more beneficial than their public counterparts. They accepted the fact that the subject is important in everyday life, help people to make good decisions, must not be an optional subject to study in schools and it is needed most in their future career. This affirms Syyeda's findings that if students recognise the importance of Mathematics in their lives, they will become motivated to study, practice, and learn the subject (Syieda, 2016) [40]. The findings also reveal despite the fact that some students had nor recognition of the subject as beneficial, they demonstrated positive cognition towards it. Guy *et al* (2015)

The results on the students' Mathematics anxiety as an attitudinal variable from the above Tables and analysis show that students from the Private Junior High schools had relatively positive attitude towards Mathematics than their colleagues in the public schools. This is possibly because children who attend private basic schools come from wealthier, more highly educated families, and have higher scores on early learning skills. Hence students in the Private J.H.S. do have positive attitudes to most institutionalized forms of study, including Mathematics (Mohd & Mahmood, 2011) [27].

The positive attitudes led to significant differences between their performances, Akaguri, (2011) [4]. He explains that the decrease in attitude at the Public Junior High school could be related to curriculum organization, supervision, motivation and method of instructional delivery in the classroom environment. As students' advanced in school education, the mathematics curriculum become more demanding, requiring a more abstract level of understanding. This high level of Mathematics anxiety at the Public J.H.S. could be shortage of teachers and challenges with scarcity of teaching-learning resources. Students disliked Mathematics when teaching-learning materials and resources are scarce, Nsiah, (2004) [31]; Rolleston and Adefeso-Olateju, (2012) [37].

3.2 Research question two

What is the level of Private and Public J.H.S. students' Mathematics achievement?

To identify the level of Mathematics achievement for the sampled schools, Students' Mathematics Achievement Test (SMAT) was prepared for all the participated schools. This helped the researcher to identify the level of achievement in Mathematics for the two categories of schools in the subject. The summary of the result of the respondents is recorded in Table 5 below

Table 5: Comparison of Private and Public J.H.S. Students' Mathematics Achievement Level

Junior High Schools												
	Public Schools						Private Schools					
School Name	A	C	B	D	E	F	A	C	B	D	E	F
Gender	M	F	M	F	M	F	M	F	M	F	M	F
Mean	6.1	6.8	5.2	6.3	5.1	2.6	15.5	14.4	13.8	10.1	8.8	9.6
Grand Mean	6.38		5.70		3.77		15.33		11.66		10.96	

The results show that the Private Junior High Schools level of achievement in the mathematics subject is higher than the achievement of the Public J.H.S. Mathematics achievement of the private J.H.S male students' mean scores for D, E and F were respectively 15.5, 13.8 and 8.8. But comparing to the public male students, private male students had better Mathematics achievement scores despite the minimum mean score of school F. The situation was not different from their male counterparts. The female students of school D had a mean score of 14.4 which is above the average result followed by female students from schools E and F with minimum mean scores of 10.1 and 9.6 respectively. In general, the Private Junior High Schools had a very high level of Mathematics achievement than their Public J.H.S. The implication of this outcome is the fact that the private schools may be more resourced, had parents of pupils whose socio-economic status was higher and hence were more involved in their children's education than the public, Iddi, (2016). His finding further revealed that the high academic achievements of private school students were attributed to

strict internal supervision of the school heads/proprietors. The findings were also in line with Akaguri, (2011)^[4] that the choice of a particular school type by parent could be influenced by perceived school effectiveness, which is often judged in terms of the number of pupils that pass standardized tests in external examination.

As mentioned in the result from Table 9; Private J.H.S. students had significantly higher achievement score in Mathematics than the Public J.H.S. This result provided an answer to hypothesis 3 that there is no significant difference between the performance of Private and Public J.H.S. students in Mathematics. The result indicated that, at 5% significant level the difference was significant ($t(174) = 10.759, p < 0.05$). That is, the students from the Private J.H.S. performed significantly higher than their colleagues in the Public J.H.S. in the Abesim circuit with an effect size of 1.64.

The outcome agrees with the work of Iddi, (2016) in his comparative assessment of the academic performance of Private and Public J.H.S. in the Tamale metro polis, Private J.H.S. always get higher aggregate mean score than students from Public J.H.S. The difference in Mathematics achievement was due to several factors such as; lack of supervision by government authorities, lack of more dedicated teachers and lack of competition among students, lack of involvement of parents in the education of students, lack of professional qualifications among teachers and improper teaching methods.

The findings were also in line with Rolleston and Adefeso-Olateju, (2012)^[37] that parents choose Private J.H.S. over Public J.H.S. because of better examination performance and access to higher levels of education. Surapur (2015), found that the private schools provide better services in comparison with government schools and they have higher critical thinking levels and study habits than the government school students. Students whose parents are more educated enroll them at the Private J.H.S. and normally record highest academic achievement (Leela, 2016).

3.3 Hypothesis One

H₀: There is no significant difference between the attitudes of private and public Junior High School students toward Mathematics.

H₁: There is significant difference between the attitudes of private and public Junior High School students toward Mathematics.

In testing for this hypothesis, responses to the various attitudinal variables were assigned values. Mean score more than 13.39 indicates a more positive characteristic (high average) and a score less than 13.39 indicates a negative characteristic (low average) of the variable.

Table 6: Mean comparison of Private and Public J.H.S. students' attitude towards mathematics

Sub - Scale	Private J.H.S.		Public J.H.S.		t-value	Effect Size (d)
	Mean	Sd	Mean	Sd		
Anxiety	16.51	8.029	21.90	7.667	4.335*	0.660
Confidence	22.49	3.699	21.31	4.019	1.960*	0.298
Enjoyment	23.86	4.445	19.98	4.044	5.747*	0.875
Benefit	24.00	3.572	21.94	3.252	3.856*	0.587
Overall	21.72	4.936	21.28	4.746	3.975*	0.605

*Significant level at 0.05

From Table 6 above, the mean attitudes of the Private J.H.S

students and the Public J.H.S. in both schools in the study area across all the four subscales (Benefits, Anxiety, Confidence and Enjoyment) show that both schools had favorable attitudes toward Mathematics with their mean values varying between 24.00 and 16.51 that are above 13.39, the average attitudinal value. The overall mean attitudes toward Mathematics for the Private J.H.S. (Mean = 21.72, Standard Deviation = 4.936) was relatively higher than that of the Public J.H.S. (Mean = 21.28, Standard Deviation = 4.75). Comparatively, the Private J.H.S. students possessed more positive attitude with t-values (4.335, 1.960, 5.747 and 3.856) for all the four subscales. The overall attitudinal mean scores showed medium significant difference between the total mean scores of the two groups towards mathematics (0.605). The null hypothesis that: "there is no significant difference between the attitudes of Private and Public J.H.S. students toward mathematics" was therefore rejected in favor of the alternate hypothesis

This outcome agrees with the results of Khan and Rodrigues, (2012)^[20] who stated that private and public students show positive attitudes towards mathematics. However, the difference in the findings could be as a result of time lapse, geographical, religious, social and cultural differences; Alderman, Orazem and Paterno (2001). It could also be based on the fact that students' responses to the questionnaire were influenced by their friends or they might have not had a feel of any external examination in Mathematics like the Basic School Certificate Examination (B.E.C.E.) and so might not have built a true attitude (positive or negative) towards Mathematics at that level, Kasimu (2017)^[18].

3.3.1 Hypothesis Two

H₀: There is no significant difference between the achievement of private and public J.H.S. students in Mathematics

H₁: There is significant difference between the achievement of private and public J.H.S. students in Mathematics

Table 7: Group statistics of Private and Public J.H.S. Mathematics Achievement

Mathematics Achievement	School type	N	Mean	SD
	Private	79	12.71	5.131
Public	95	5.32	2.788	

Table 8: Independence samples t-test of Private and Public J.H.S. Mathematics Achievement

Mathematics Achievement	F	t	df	p	Std. Error Mean	Effect size (d)
	43	10.759	174	0.000	0.6849	1.64

Alpha = 0.05

The achievement test was scored out of twenty-five (25) and analyzed according to the research questions. The mean score on the achievement test for Private schools was calculated to be 12.71 and that of public schools was 5.32. The two means indicated that students from the Private J.H.S. performed better than their colleagues in the public J.H.S. as indicated on Table 11.

From Table 12, independent samples t-test was used to test whether the difference between the mean scores was significant. The result indicated that, at 5% significant level the difference was significant ($t(174) = 10.759, p < 0.05$).

That is, the students from the Private J.H.S. performed significantly higher than their colleagues in the Public J.H.S. in the Abesim circuit with an effect size of 1.64. The null hypothesis that “there is no significant difference between the performance of Private and Public J.H.S. in Mathematics” is therefore rejected in favour of the alternate hypothesis.

The outcome agrees with the work of Iddi, (2016) in his comparative assessment of the academic performance of Private and Public J.H.S. in the Tamale metro polis, Private J.H.S. always get higher aggregate mean score than students from Public J.H.S. The difference in Mathematics achievement was due to several factors such as; lack of supervision by government authorities, lack of more dedicated teachers and lack of competition among students, lack of involvement of parents in the education of students, lack of professional qualifications among teachers and improper teaching methods.

The findings were also in line with Rolleston and Adefeso-Olateju, (2012) ^[37] that parents choose Private J.H.S. over Public J.H.S. because of better examination performance and access to higher levels of education. Surapur (2015), found that the private schools provide better services in comparison with government schools and they have higher critical thinking levels and study habits than the government school students. Students whose parents are more educated enroll them at the Private J.H.S. and normally record highest academic achievement (Leela, 2016).

4. Conclusion

From the above findings the researcher arrived at the following conclusions. There was a significant difference in the attitudes of Private and Public J.H.S. students toward Mathematics as students from the Private J.H.S showed more positive attitude than their public counterparts. The Private J.H.S. students achieved significantly higher scores in Mathematics than the Public J.H.S. students. Mathematics achievement and attitude are closely related variables that play important role in learning mathematics.

Recommendations:

Based on the findings of the study, the following recommendations are made:

- Mathematics teachers should develop positive relationship with students and stress classroom activities that will involve active teaching-learning process and students’ participation in the class.
- Mathematics teachers should provide an appropriate conducive environment in which students can learn, appreciate and enjoy the subject.

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