❐   277

The Effects of Students' Motivational Factors on their Attitudes toward Mathematics

Samson Oyelola Oyedeji
Demonstration Secondary School, University of Benin, Benin City, Nigeria

Article Info	ABSTRACT
	Mathematics is the only subject that cut across all sciences; hence the need for students' positive attitudes toward mathematics cannot be under-estimated. Students' motivation has been found to be having a positive relationship with the students' attitudes toward mathematics. The aim of the study was to use path analysis to investigate the type of direct effects the motivational factors have on the students' attitudes toward mathematics. To do this, twelve senior secondary schools were randomly selected from the Edo State South Senatorial District. Thirty students were randomly selected from each of the schools and a total of three hundred and sixty students were used for the study. A self-designed four-likert scale questionnaire titled "Students' Motivational factors and Attitudes toward mathematics" was used to gather information from the subjects. Pearson Moment correlation and Regression analysis were used to analyse the data obtained from the questionnaire. The findings of the study revealed that intrinsic, home environment and teacher factors have positive direct effects on the students' attitudes toward mathematics with intrinsic factor having the strongest and the most significant effect on students' attitudes toward mathematics. The findings also revealed that peer group factor and school environment factor have negative effects on students' attitudes toward mathematics. It was also discovered that all the motivational factors have positive and significant relationship with each other except intrinsic and school environment factors that have negative relationship with each other.

Corresponding Author:

Samson Oyelola Oyedeji
Demonstration Secondary School,
University of Benin,
Benin City, Edo State, Nigeria
Email: oyelolasamson@yahoo.com

1.   INTRODUCTION

Children at their early stage in life appear to be propelled by curiosity, driven by an intense need to explore, interact with, and make sense of their environment. According to Piaget theory of cognitive development, children between the ages of 7 to 11 years are in the concrete operation level. They can comprehend the principle of conservation which permits them to grapse [1],[2]. As they grow older learning, especially mathematics, becomes associated with drudgery instead of delight. Nicolaidou and Philippou [3] stated when children first go to school they usually have positive attitudes towards mathematics. However, as they progress, their attitudes become less positive and frequently become negative at high school Gottfried, et all [4] found that from the ages of 9 to 16 years (although there was a slight increase for 17-year olds), children's overall intrinsic motivation for academic learning declined, with particularly marked decreases in mathematics and the sciences. At this stage children need a driving force that will compel them to develop positive attitude toward the learning of mathematics. Motivation is the driving force that compels or reinforces an action toward a desired goal. It is a psychological feature that arouses an organism to act

towards a desired goal and elicits, controls, and sustains certain goal-directed behaviours [5]. Motivation has been shown consistently to strengthen the ability to concentrate on school work and consequently with achievement, while their absence is associated with disengagement from learning behaviours and failure in school work. J. Green et all [6] reported that high levels of motivation to do well at a valued activity have been shown to be associated with academic achievement. According to P. R. Pintrich and D. H. Schunk [7] motivation influences how and why people learn as well as how they perform. In the study on predicting student success with the Learning and Study Strategies Inventory (LASSI), A. B. Hendrickson [8] found that motivation and attitude were the best predictors of student grade point average. Motivated students engage in the task with intensity and feeling, whereas unmotivated students procrastinate and indicate in other ways that they would rather do something else [9].

Students' motivation is made up of factors that can be grouped as intrinsic or internal factors and extrinsic or external factors. A student who is intrinsically motivated undertakes an activity "for its own sake, for the enjoyment it provides, the learning it permits, or the feelings of accomplishment it evokes" [10]. Intrinsic factors include student interest, self-efficacy, need for achievement, achievement goals, expectancies and values and failure avoidance. Extrinsic factors include home environment, school environment, teacher's factors and peer group. Teach Thought Motivation theory explains that both intrinsic and extrinsic, is a key factor in the success of students at all stages of their education [11].

Many research studies have shown the relationship between students' motivation and their attitude toward the learning of mathematics. A study titled "Attitudes towards Mathematics: Effects of Individual, Motivational, and Social Support Factors" found that motivation related variables are the main predictors of attitudes towards mathematics [12]. When reviewing literature aimed at understanding attitudes and the influences on their development in relation to differences between students identified motivation as one of the students' factors that play a vital role in influencing students' attitude toward mathematics [13]. Siti and Effandi [14] in their study titled "the learning environment, teacher's factors and students' attitudes amongst engineering technology students", found that the correlation between learning environment and attitude towards mathematics was significantly moderate and that generally, learning environment and teacher's factor are two factors that need the institutions' consideration in producing students with positive attitude towards mathematics. Young children's intrinsic motivation to learn (i.e., desire to learn for its own sake), according to Geary[15], is positively correlated with academic outcomes in mathematics and other domains. However, intrinsic motivation declines across grades, especially in mathematics and the sciences, as material becomes increasingly complex and as instructional formats change.

The literature reviewed above indicated that emphases have been laid on the relationship between students' collective motivational factors and their attitudes toward mathematics but little or no attention has been paid on the type of effect each of the motivational factors has on the attitude of students toward mathematics. The aim of this study therefore, was to use path analysis to investigate the type of direct effect that each of the motivational factors has on the students' attitude toward mathematics.

Fabien identified intrinsic motivation, Home Environment, Peer motivation, School System and Teacher's motivation as the students' motivational factors [20]. Yahaya (2010) identified teacher, peer-group, family, School environment, and language as students' extrinsic motivational factors. For the purpose of this study Intrinsic, Home Environment, School Environment, Peer-group and teacher factors were used as students' motivational factors. Figu re 1 is the proposed path model.
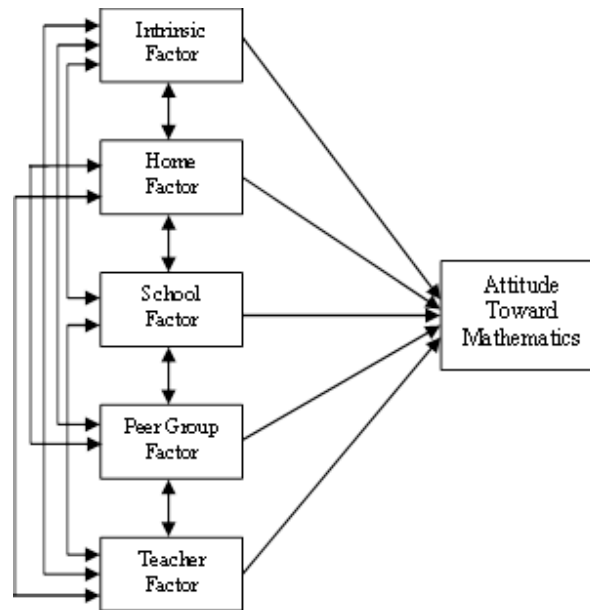
Figure 1. Proposed Path Diagram

2. SIGNIFICANCE OF THE STUDY

This study was significant as the results would reveal to the teachers the need to develop positive attitude towards the teaching of mathematics and employ teaching strategies that will motivate the students and thereby enhance their attitude toward mathematics. Both federal and state governments, on their part would realise the need to provide good school environment that will facilitate students' positive attitude toward mathematics and consequently improve their performances in mathematics. Parents would be able to create conducive home environment that would motivate their children to develop positive attitude toward mathematics and monitor the type of friends their children/wards keep in school.

3. PATH ANALYSIS MODEL

Path analysis is an extension of the regression model. Its aim is to provide estimates of the magnitude and significant of hypothesised causal connections between sets of variables. Path analysis is a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables. It is a methodology for representing, estimating, and testing a theoretical network of linear relations between variables [16]. Path analysis, according to MacCallum and Austin [17] tests hypothesized patterns of directional and non-directional relationships among a set of observed (measured) and unobserved (latent) variables. Path analysis is a statistical technique used primarily to examine the comparative strength of direct and indirect relationships among variables [18].

Path model is usually depicted in a closed region and arrow figure in which single headed arrows indicate causation. A regression is done on each variable in the model as a dependent on others which the model indicates are causes. The regression weights predicted by the model are compared with the observed correlation matrix for the variables and a goodness-of-fit statistics is calculated. The best fitting model is selected by the researcher as the best model for advancement of theory. An example of path model is presented in Figure 2.
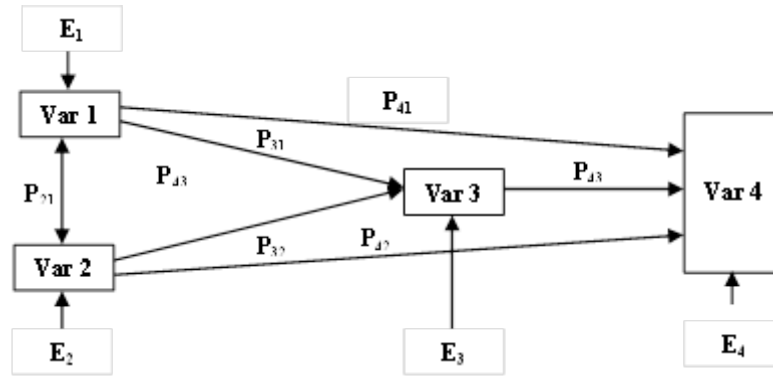
Figure 2. Example of Path Diagram

Variable 1 and variable 2 are called exogenous variables. Exogenous variables in path analysis model are those variables with no explicit causes (no arrows go to them other than the measurement error term E). If exogenous variables are correlated, this is indicated by double-headed arrows connecting them. Var 3 and Var 4 are called endogenous variables. Endogenous variables include intervening variables, causal variables and dependent variables. Intervening endogenous variables have both incoming and outgoing arrows in the path diagram. The dependent variable has only incoming arrow.

Pij are the path coefficients. A path coefficient is a standardised regression coefficient (beta weight) showing the direct effect of an independent variable on a dependent variable in a path model. Thus when the model has two or more causal variables, path coefficients are partial regression coefficients which measure the extent of effects of one variable on another in the path model controlling for other prior variables, using standardised data.

4. METHOD

The target population of the study was the senior secondary school students in Edo State South Senatorial District. Twelve Senior Secondary Schools were randomly selected and 30 students were randomly selected from each of the schools. A total of three 360 students were used for the study. A self-designed four-likert scale questionnaire titled "Students' Motivational Factors and Attitudes toward Mathematics Questionnaire" was used to gather information from the students. The questionnaire was divided into two sections. Section A was titled Students' Motivational Factors and it was sub-divided in to five (5) sub-sections – Intrinsic factors, Home factors, School factors, peer Group factors and Teacher factors. Section B of the questionnaire was titled "Students' Attitudes toward Mathematics". Cronbach Alpha Formula using SPSS 20 was used to establish the internal consistencies of the two sections of the questionnaire and the reliability coefficients of 0.81, 0.75, 0.73, 0.73 and 0.87 were obtained for intrinsic, home environment, school environment, peer group and teacher factors respectively. A reliability coefficient of 0.87 was obtained for students' attitudes toward mathematics. Out of 360 questionnaires administered while 317 were finally used for analysis. Pearson Moment Correlation and Regression Analysis were used to analyse the data gathered.

5. RESULTS AND DISCUSSION
5.1. Results

Table 1 reveals that intrinsic factor, teachers' and home environment factors have positive relationship with the students' attitudes toward mathematics while the peer group and school environment factors have negative relationship with the students' attitudes toward mathematics. The relationships between intrinsic, home environment and school environment factors and students' attitudes toward mathematics were significant at $p<.05$ while the relationship between teachers' factors and students' attitudes toward mathematics was marginal. The table also shows that all the motivation factors are positively related and the relationships are significant at $p<.05$ except the relationship between intrinsic factor and school environment which is negative and not significant at $p<.05$.

Table 1. Correlation Matrix of the Relationship between the Motivation Factors and Students' Attitudes toward Mathematics and among the Motivation Factors

		intrinsic factor	teachers' factor	peer group factor	home environment factor	school environment factor
Correlation	intrinsic factor					
	teachers' factor	.300				
	peer group factor	.310	.442			
	home environment factor	.400	.321	.442		
	school environment factor	-.051	.271	.538	.327	
	attitude toward mathematics	.588	.093	-.017	.171	-.241
Sig. (1-tailed)	intrinsic factor					
	teachers' factor	.000				
	peer group factor	.000	.000			
	home environment factor	.000	.000	.000		
	school environment factor	.181	.000	.000	.000	
	attitude toward mathematics	.000	.050	.379	.001	.000

Table 2 reveals that R = .635 and R^2 = .403. The implication of this result is that 40.3% of the variance in the dependent variable (i.e students' attitude toward mathematics) was accounted for by the independent variables (i.e intrinsic, teachers' school environment, home environment and peer group factors).

Table 2 Model Summary of Students' Attitudes toward Mathematics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.635[a]	.403	.394	5.85774

a. Predictors: (Constant), school environment factor, intrinsic factor, teachers' factor, home environment factor, peer group factor

Table 3 shows that the sum of square of the residual is 10673.052 and the mean square is 1438.493. The calculated F value is 41.932 and it is significant at p< .05. The implication of this result is that the contribution of the five motivational factors in unison to the prediction of the students' attitudes toward mathematics is significant at p<.05.

Table 3. ANOVA of the contribution of the independent variables to the prediction of the Dependent variable

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7192.467	5	1438.493	41.923	.000[b]
	Residual	10637.052	310	34.313		
	Total	17829.519	315			

a. Dependent Variable: attitudes toward mathematics.
b. Predictors: (Constant), school environment factor, intrinsic factor, teachers' factor, home environment factor, peer group factor.

Table 4. Path Coefficients of the independent variables

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	34.640	2.283		15.175	.000
intrinsic factor	.813	.069	.611	11.730	.000
teachers' factor	.002	.071	.093	1.651	.100
peer group factor	-.349	.142	-.147	-2.452	.015
home environment factor	.085	.117	.171	3.078	.002
school environment factor	-.250	.097	-.241	-2.590	.010

a. Dependent Variable: attitude toward mathematics

The individual contribution of the independent variables to the prediction of the dependent variable is given by their coefficients B. The positive values of intrinsic factors, teachers' factor and home environment factors indicate positive relationship while the negative values of peer group and school

environment factors indicate negative relationship. The t values of intrinsic and home factors revealed that the positive relationship are significant at p<.05 while that of the teachers' factor is not significant at p<.05. The t values of peer group and school environment factors showed that the negative relationship are significant at p<.05.

The standardised Beta values in the table indicate the effects of the intrinsic, teachers', peer group, home environment and school environment factors on the students' attitudes toward mathematics. These Beta values are the path coefficients of the direct effects of the motivational factors on the students' attitudes toward mathematics. The table revealed that the Beta coefficients of intrinsic, teachers' and home environment factors are positive while the Beta coefficients of the peer group and school environment factors are negative. The implication of these results is that intrinsic, teachers' and home environment factors have positive direct effects on the students' attitudes toward mathematics and peer group and school environment factors have negative direct effects on the students' attitudes toward mathematics. The resulted path diagram is as presented in Figure 3.
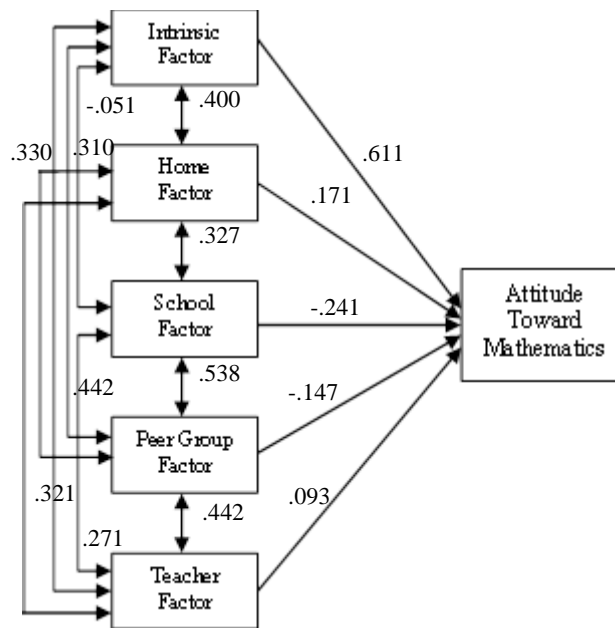

Figure 3. The Final Path Diagram

5.2. Discussion
5.2.1. Effects of Intrinsic Motivation on Students Attitudes toward Mathematics:

The results of the study revealed that intrinsic motivation has high significant relationship (.588) with students' attitudes toward mathematics and has positive effects (.611) on students' attitudes toward mathematics. The results also indicated that intrinsic motivation has the highest contribution (.813) to the prediction of the students' attitudes toward mathematics. These results corroborated with C. Liu [19] and J. Fabien [20] assertion. Interest motivation has direct (the most significant) effects on students' subject learning attitudes [19]. J. Fabien [20] asserted that "the most powerful motivation, however, is intrinsic motivation for no matter how favourable external factors are, unless a student has set goals that he is determined to achieve , he can easily be side tracked by factors such as peer pressure, complacency or simply his own indecisiveness". The implication of these results is that intrinsically motivated students are conscious of their set goals; hence they tend to develop the right attitude that would help to achieve their set goals. They are more likely to be lifelong learners, continuing to educate themselves outside the formal school setting long after extrinsic motivators. According to Borich G. D. And Tombari M. L. [21], "Intrinsic motivation influences learners to choose a task, get energized about it, and persist until they accomplish it successfully, regardless of whether it brings an immediate reward. Intrinsically motivated learners have more than just a vision of a goal they want to achieve; they have a passion or interest for achieving that goal".

It is therefore imperative for mathematics teachers to design the instructions in such a way that interest in mathematics, curiosity to learn mathematics, confidence, mathematics self-efficacy, self-esteem

and spirit of fear of failure are developed in the students. When curiosity, independence, and exploration result with experiences of mastery and meet the approval and encouragement of mathematics teachers, children experience pleasure, feel competent and in control of their environment, and have stronger intrinsic motivation for mathematics.

5.2.2. Effects of Home Environment on Students' Attitudes toward Mathematics

The results of the study indicated that home environment has positive and significant relationship (.400) with the students' attitudes toward mathematics and with the other motivational factors. The results also revealed that Home environment has positive effect (.171) on the students' attitudes toward mathematics and it contribution (.085) to the prediction of students' attitudes toward mathematics is significant at p<.05. These results are similar to the ones obtained by Padlick-Field [22]. Padlick-Field [22], in his study titled "The Impact of the Home Environment on Children's Attitudes Towards Literacy", found that the structure of the home environment, along with parental attitudes and parental involvement, positively impact a child's attitudes towards literacy. He concluded that the interactions that a child has with his or her parents, caregivers, and other family members, along with other aspects of the home environment, all play a role in the a child's literacy development and help to form early attitudes towards literacy. According to S. B. Heath [23] parents are their child's first teacher, and most of the literacy experiences that a child brings to school with them are born out of the context of that child's home environment. The results also concur with S. B. Heath [24] stated that there appears to be a large body of evidence that suggests the home environment not only affects students' achievement, but also their abilities and attitudes towards mathematics. He stressed that efforts to get parents involved in students' mathematics learning can indeed improve the students' performances.

The implication of these results is that majority of the Senior Secondary School students in Edo South Senatorial District, Nigeria, come from homes where students' attitudes toward mathematics are promoted. Parental attitudes, educational aspirations, and socio-economic status are all part of a student's home environment [22]. A student's home environment can be seen as an agency that aids in the construction of student attitudes toward mathematics and mathematics achievement. Parental aspirations and expectations exert strong influence on students' attitudes toward the learning of mathematics. Parents who aspire and expect their children to study mathematics or mathematics related courses in the tertiary institutions would do all possible best to develop positive attitudes in their children right from secondary school.

When parents are involved in students education students exhibit more positive attitudes and behaviour toward their studies. In a home where parents are actively involved in their children education, parents are able to learn how to perceive their children's developing abilities and skills in mathematics, and therefore able to define appropriate levels of expectations and development. Hence partnership and cooperation between homes and schools are important when it comes to mathematics because how the parents socialise their children can greatly affect their children's attitudes toward mathematics and achievement in mathematics.

5.2.3. Effects of School Environment on Students' Attitudes toward mathematics

The results of the study revealed that the school environment has negative relationship (-.051) with students' attitudes toward mathematics and the relationship is not significant at p<.05. The effect of school environment on students' attitudes toward mathematics is negative (-.241) and its contribution to the prediction of the students' attitudes toward mathematics is also negative (-.250). These results are contrary to the one obtained by Siti & Effandi (2010) in their study titled "the learning environment, teacher's factor and students' attitude towards mathematics amongst engineering technology students". They found that there is a significant relationship between the variables with moderate positive correlation (r = 0.432, n=102, p =0.00). The difference in the results might be due to the fact that Siti & Effandi carried out their study in a tertiary institution and possibly in an environment that was conducive for teaching and learning of mathematics.

Research study by Opdenakker [25] revealed that class and school characteristics have an effect on student attitudes towards mathematics, even after factoring in student background characteristics. They noted that classroom climate characteristics such as study orientation and the extent to which students as a group experience the teaching of mathematics as constructivist seem relevant to attitudes. It was concluded that if the environment is physically, mentally, or emotionally unsafe, then it will be hard for the student to put all of his or her attention on learning. The implication of their results is that the type of the school environment determines whether students would have positive or negative attitudes toward mathematics.

Studies have shown that school facilities in Nigerian secondary schools are generally in state of despair and the school environments are not conducive for learning as a result of dilapidated classroom buildings, leaking roofs and lack of furniture for students and teachers [26],[27],[28]. It is therefore suffices to say that the negative relationship between school environment and students attitudes toward mathematics

and the negative effect of school environment on the students attitudes toward mathematics obtained in this study was as a result of poor state of the school environment in Edo South senatorial District.

A school's physical environment includes the school building and the surrounding grounds, such as noise, temperature, and lighting as well as physical, biological, or chemical agents. Physical and psychological safety, positive interpersonal relationships, recognition of the needs and success of the individual, and support for learning are all part of the psychosocial environment [29]. The importance of a healthy and conducive school environment that can promote positive students' attitudes toward mathematics thereby enhancing their performance in mathematics cannot be over enphasised. A safe, clean and well-maintained school with a positive psychosocial climate and culture can foster school connectedness which in turn boosts students and staff health as well as students' educational achievement. The core business of school is to provide students with a rich learning environment that is open, respectful, caring and safe for learning. Such an ideal learning environment will develop students interest to learn and promote positive attitudes toward their studies especially mathematics. It is therefore imperative for the school administrators to ensure that school facilities are well maintained and educative materials that will promote students' attitude toward mathematics are readily available in schools.

5.2.4. Peer Group Factor

It was revealed that peer group influence has a negative relationship with students' attitudes toward mathematics and the relationship is not significant at p<.05. It was also revealed that peer group influence has negative effect on students' attitudes toward mathematics. These results are similar to the one obtained by [30]. E. Mukama [30] found that the Pearson Correlation coefficient of the relationship between Peer Group Influence and Secondary School Students' Attitudes Towards School was -.100 and it was significant at .178. Similarly, E. Ampadu [31], in his study titled "Does Peer Influence Affect Students Participation in Mathematics?", found that students have the enthusiasm and willingness to answer questions in class but given a wrong answer is something they all try to avoid as their colleagues will mock at them. He concluded that the kind of feedback that students get from their colleagues influence their level of participation and willingness to answer questions in mathematics class.

Senior secondary school is an important period of time in an adolescent's life. It is at this level of education that students are making decisions about their course taking and future educational and career plans. It is also the time when parental authority is being challenged by peer pressure. Lindgren [32] observed that, individuals need to relate to their peers for they are dependent on their attitudes, feelings, and expectations to help them construct their own views of the world. According to P. Gara and Davis U. C. [33], Peers can exert extraordinary influence over each other particularly in regard to academic aspirations and attitudes towards school. The degree of its impact depends on each individual student. Peers with positive attitudes and behaviours toward education, will allow and teach each other to set goals that include opportunities to learn and achieve [34]. Wanting to be part of a group and a sense of belonging among their friends seems to be a priority although at the expense of not taking mathematics seriously. It is therefore the duty of the parents and teachers to provide adequate guidance to adolescents to help them understand how the friends they keep can either positively or negatively influence their attitudes toward mathematics and consequently their academic performances in school.

5.2.5. Effect of Teacher's Factor on Students' Attitudes toward Mathematics

The findings of the study showed that there was a positive relationship between teacher's factor and students' attitudes toward mathematics (.093) but the level of significance is .05. The results also revealed that teacher's factor has positive and significant relationship with each of the other motivational factors and its contribution to the prediction of the students' attitudes toward mathematics and its effect on students' attitudes toward mathematics are both positive but not significant at p<.05.

The implication of these results is that the relationship between teacher's factor and students' attitudes toward mathematics was marginal and its effect on students' attitudes toward mathematics was not significant at p<.05. These results were not in agreement with the ones obtained by previous researchers. For instance [14] found that the relationship between teacher's factor and students' attitude towards mathematics was significant at p<.05 with moderate positive correlation (r = 0.432, n=102, p =0.00). Yara [35] found in his study entitled " Students Attitude towards Mathematics and Academic Achievement in Some Selected Secondary Schools in South western Nigeria", found that the students' attitude can be affected by teacher's factor especially their attitude in classroom. The difference in the results may not be unconnected to lack of teaching and learning facilities and poor state of the Senior Secondary Schools environments in Nigeria and Edo State South Senatorial District in particular. Non-availability of adequate teaching materials, un-conducive classroom environment and lack of offices with good furniture to prepare lessons lead to teachers'

low morale and consequently affect their attitudes toward the teaching of mathematics. Research studies have shown that teachers' attitudes toward teaching affect students' attitudes toward learning [36]-[41].

Teacher's factor, according to Balozi and Njunge [38], plays an important role in affecting students' attitude towards mathematics. Teachers are role models whose behaviours are easily copied by students. What teachers like or dislike, appreciate and how they feel about their learning or studies could have a significant effect on their students [41]. Students draw from their teachers' disposition to form their own attitudes which eventually influence their learning outcomes [42]. The mathematical knowledge, informed actions positive attitudes and high expectations of mathematics teachers, according to NTMC [43], lead to mathematics learning, confidence, and the development of a positive attitude toward mathematics on the part of all students. It is therefore suffices to say that the effective attitudes and actions employed by mathematics teachers ultimately can make a positive difference on the attitudes of the students toward mathematics. Teacher's way of thinking and his inward feelings which are expressed as outward behaviour have significant effects on the students' attitude toward learning especially mathematics. Mathematics teachers, as mentors and role models, are therefore expected to develop positive attitudes toward the teaching of mathematics irrespective of the conditions of the school environment and adopt teaching strategies that will promote students' positive attitudes toward mathematics.

6.   CONCLUSION

Based on the findings of this study, it can be concluded that students' intrinsic motivational factor, students' home environment and teacher factors have positive direct effects on students' attitudes toward mathematics in senior secondary school. Students' intrinsic motivational factor is having the strongest and most significant positive effect on students' attitudes toward mathematics. It can also be concluded that poor learning environment and peer group influence can have negative effects on students' attitudes toward mathematics.

7.   RECOMMENDATIONS

To promote students' positive attitudes toward mathematics through student' motivation, the following recommendations are made:

Intrinsic motivation should be enhanced among the students. This can be done by promoting students' personal sense of autonomy, giving mathematical tasks that are challenging and relevant to students' everyday life, creating social relationships that are supportive and providing the learning environments that are physically and psychologically safe.

In making instruction interesting in learning mathematics, it is recommended that methods/ strategies and material/media which will make the learning of mathematics, active, investigative and adventurous as much as possible should be employed by the mathematics teachers. Such methods also must be ones that take into account, learner's differences and attitudes towards mathematics as a subject. Mathematics teachers should design lessons that would allow students participate in empowering activities in which they would understand that learning is a process and mistakes are a natural part of learning.

It is also recommended that mathematics teachers should be proactive in promoting a classroom environment which is free from intimidation and fear of participation. Mathematics teachers and the students should see mistakes as part of the learning process and correcting such misconceptions among students lead to the creation of new knowledge. A learning environment where students are active participants as individuals and as members of collaborative group should be created. Mathematics teachers should motivate students, encourage them to accept responsibility for their own learning, accommodate the diverse learning needs and nurture their desire to learn in a safe, healthy and supportive environment which develops compassion and mutual respect.

A conducive home and school environments that would motivate students to develop positive attitudes toward mathematics thereby enhancing their performances in mathematics should be created by both the parents and school administrations. To increase satisfaction with the learning experience and in turn attitudes toward mathematics and consequently performance in mathematics, the well-being of the students should not be compromised.

Parents and teachers should provide adequate guidance to adolescents to help them understand how the friends they keep can either positively or negatively influence their attitudes toward mathematics and consequently their academic performances in school.

REFERENCES

[1]   M. W. Enose, "Piaget's theory of intellectual development and its implication for instructional management at pre-secondary school level," *Educational Research and Reviews,* vol/issue: 5(7), pp. 366-371, 2010.
[2]   B. Ojose, "Applying Piaget's Theory of Cognitive Development to Mathematics Instruction," *The Mathematics Educator,* vol/issue: 18(1), pp. 26–30, 2008.
[3]   M. Nicolaidou and Philippou G., "Attitudes towards mathematics, self-efficacy and achievement in problem solving," European Research in Mathematics Education III, M. A. Mariotti, Ed., University of Pisa, Pisa, Italy, pp. 1–11, 2003.
[4]   A. E. Gottfried, *et al.*, "Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study," *Journal of Educational Psychology*, vol. 93, pp. 3–13, 2001.
[5]   Wikipedia. Motivation, http://en.wikipedia.org/wiki/Motivation.
[6]   J. Green, *et al.*, "Motivation and engagement in English, mathematics and science high school subjects: Towards an understanding of multidimensional domain specificity," *Learning and Individual Differences*, vol/issue: 17(3), pp. 269-279, 2007.
[7]   P. R. Pintrich and D. H. Schunk, "Motivation in education: Theory, research, and application," Englewood Cliffs, NJ: Prentice-Hall Inc., 1996.
[8]   A. B. Hendrickson, "Predicting student success with the Learning and Study Strategies Inventory (LASSI)," Unpublished master's thesis. Iowa State University, Ames, IA, 1997.
[9]   A. Kaplan, "Intrinsic and Extrinsic Motivation," 2010. http://www.education.com/reference/article/intrinsic-and-extrinsic-motivation/.
[10] M. R. Lepper, "Motivational Considerations in the Study of Instruction," *Cognition and Instruction*, vol/issue: 5(4), pp. 289-309, 1988.
[11] Teach Thought, "21 Simple Ideas To Improve Student Motivation," 2012. http://www.teachthought.com/teaching/21-simple-ideas-to-improve-student-motivatio/.
[12] M. L. Mata, *et al.*, "Attitudes towardsMathematics: Effects of Individual, Motivational, and Social Support Factors," *Child Development Research*, vol. 2012, 2012.
[13] Mohamed L. and Waheed H., "Secondary Students' Attitude towards Mathematics in a Selected School of Maldives," *International Journal of Humanities and Social Science*, vol/issue: 1(15), pp. 277-281, 2011.
[14] M. B. M. Siti and Z. Effandi, "The Learning Environment, Teacher's Factor and Students Attitude towards Mathematics Amongst Engineering Technology Students," *International Journal of Academic Research*, vol/issue: 2(2), pp. 16-20, 2010.
[15] G. C. Geary, *et al.*, "Report of the Task Group on Learning Processes," 2008.
[16] E. E. Rigdon, "Structural equation modelling," in Modern methods for business research, G. A. Marcoulides (editor). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers, pp. 251-294, 1998.
[17] R. C. MacCallum and J. T. Austin, "Applications of structural equation modeling in psychological research," *Annual Review of Psychology*, vol. 51, pp. 201-226, 2000.
[18] C. Lleras, "Path Analysis," Encyclopedia of Social Measurement, Elservier Inc., vol. 3, 2005.
[19] C. Liu, "Factors that Influence Students' Learning Attitudes toward Computer Courses for Technology and Vocational Institute Students in Taiwan," *International Journal of Applied Management Education and Development,* vol/issue: 1(3), pp. 1-11, 2002.
[20] J. Fabien, "Motivation: factors affecting student motivation," 2013.
[21] Borich G. D. and Tombari M. L., "Educational Psychology: A Contemporary Approach (2nd edition)," Austin, University of Texas, 1996.
[22] Padlick-Field, "The Impact of the Home Environment on Children's Attitudes towards Literacy," 2011.
[23] S. B. Heath, "Protean shapes in literacy events: Ever-shifting oral and literate traditions," in E. Cushman & E. R. Kintgen & B. B Kroll & M. Rose (Eds.), Literacy: A critical Sourcebook, Boston: Bedford/St. Martin's, pp. 443-466, 2001.
[24] S. B. Sheldon, "In School, family, and community partnerships: Your handbook for action (3rd ed.)," USA: Corwin Press, 2009.
[25] M. C. Opdenakker, *et al.*, "Do Classes and Schools have an Effect on Attitudes towards Mathematics?" 2004.
[26] F. Falobi, "Infrastructural decay in Lagos schools," Daily Independent, 2013.
[27] Osondu J. N., "Public Education in Nigeria at the Crossroads," Nigeriaworld, 2008.
[28] D. O. Owuamanam, "Threats to Academic Integrity in Nigerian Universities," Lead paper presented at the conference of the National Association of Educational Researchers and Evaluators, University of Ado-Ekiti, June 13-17, 2005.
[29] E. Marx and S. F. Wooley, "Health Is Academic: A Guide to Coordinated School Health Programs," New York, Teachers College Press, 1999.
[30] E. Mukama, "Peer Group Influence, Alcohol Consumption, and Secondary School Students" Attitudes towards School," Unpublished, A Dissertation submitted in partial fulfilment for the award of the degree of Master of Arts in Counselling of Makerere University Kampala, 2010.
[31] E. Ampadu, "Does Peer Influence Affect Students Participation in Mathematics?" *International Online Journal of Educational Sciences*, vol/issue: 3(2), pp. 424-434, 2011.
[32] H. C. Lindgren, "Educational Psychology in the classroom," (6th ed), New York: Oxford University Press, 1980.
[33] P. Gara and Davis U. C., "Peer group influence and academic aspirations across cultural groups of high school students. Center for research on Education, Diversity, and Excellence," 2006.

[34] H. L. Burros and M. McCaslin, "Peer Relations and Learning," 2013.

[35] P. O. Yara, "Students Attitude towards Mathematics and Academic Achievement in Some Selected Secondary Schools in Southwestern Nigeria," *European Journal of Scientific Research*, vol/issue: 36(3), pp. 336-341, 2009.

[36] D. Aduda, "New Report Spells out the Future of Education," The Daily Nation Monday, Nation Media Group Nairobi, 2005.

[37] K. A. Alao and A. Adeleke, "A study of interference and factors influencing Phobia for mathematics among Nigeria secondary school students," *IFE Journal of Psychology*, vol/issue: 10(1), pp. 9-18, 2000.

[38] C. Balozi and J. Njunge, "Trends in Teaching approaches and methods in Science and Mathematics Education," SMASSE project, 2004.

[39] K. D. Kelly, "In students' words: The development of student attitudes toward mathematics---A social perspective," 2011.

[40] I. K. Mutah, "Increasing Effectiveness of South-South Cooperation: the Case of SMASSE Kenya and SMASE-WECSA," A paper Presented at the Workshop for Practitioners of South-South and Triangular Cooperation During the Fifth Annual United Nations Day for South-South Cooperation And the Launch of the Global South-South Development Expo on 18 December 2008 at U.N. Headquarters/New York, 2008.

[41] O. E. O. Standslause, *et al.*, "Teachers and Students Attitude towards Mathematics in Secondary Schools in Siaya County, Kenya," *Asian Journal of Management Sciences and Education*, vol/issue: 2(3), pp. 116- 123, 2013.

[42] E. O. Onoshakpokaiye, "The Influence of Teachers' Attitude on Students' Learning of Mathematics in Nigerian Secondary Schools," *Journal of Research in Education and Society*, vol/issue: 2(1), pp. 15-21, 2011.

[43] NTMC, "Response to National Math Panel: The Importance of Effective Teachers," 2011.