INFLUENCE OF MOTIVATION ON STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS IN SELECTED SECONDARY SCHOOLS IN OGUN STATE

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Abstract
The study examined the influence of Motivation on students` academic performance in Mathematics, 360 SS2 students (male=179, female=181) were used for the study. They were selected from 18 secondary schools in Ogun East Senatorial District in Ogun State using simple random sampling technique from nine local government areas in the district. Data were collected using questionnaires and a 20-item multiple-choice Mathematics Achievement Test and analyzed using descriptive analysis such as frequency counts, percentages, mean, standard deviation while, the inferential analysis was Analysis of co - variance. The results revealed that there was significant main influence of motivation on participants` academic performance; while there was no significant main influence of gender on participants` mathematics performance. Also, no significant two-way interaction effect of motivation and gender on participants` mathematics performance score. Based on the outcome of the research, the study suggested among others that Mathematics educators in teacher education institutions should pay greater attention to the ways in which prospective secondary school mathematics teachers can enhance students` motivation to learn mathematics using a variety of instructional approaches and media.

Keywords: Motivation, Mathematics, Academic Performance.

Introduction
Education has been recognized as the fundamental basis on which any nation could function effectively. It’s socio-political and economic visibility depends mainly on the qualitative education given to her citizens. According to Mbathia (2005) education supplies people with specific skills and therefore it enables them to perform their tasks effectively. Coombs (1970) classified Education into two components (inputs and outputs), according to him inputs consist of human and material resources and outputs are the goals and outcomes of the educational process. Any nation that wants to be recognized as a developed country must build its human and material resources firmly. It is based on the need of society that mathematics then arouse, the more complex a society, the more complex the mathematical needs.

However, Nigeria in her quest for technological breakthrough, and perceived usefulness of mathematics in one’s life has not only made Mathematics a compulsory subject in the curriculum of the primary and secondary schools in her educational system (FGN, 2004), it is also a pre-requisite to further their study in her tertiary institution. In the match towards scientific and technological advancement, we need nothing short of good performance in mathematics at all levels of schooling. Perhaps, that may be the reason parents in Nigeria put a great deal of pressure on their children to succeed in mathematics at all
levels of education. In spite of the exalted position which mathematics occupy in the educational system of Nigeria, there is a public outcry and deep concern by parents, educators, employers of labour and government functionaries over the increasing failure rates of students in mathematics at both internally and externally conducted examinations.

In the efforts to improve students’ cognitive and affective outcomes in mathematics, educational psychologists and mathematics educators, have continued to search for variables (personal and environmental) that could be manipulated in favour of academic gains. Of all the personal and psychological variables that have attracted researchers in this area of educational achievement, motivation is gaining popularity and leading other variables (Tella, 2007). Motivation can then mean the process of arousing the interest of an individual to take a move towards a certain goal, sustaining behaviour in progress and channeling behaviour into a specific course of action. According to Arnes, (1992) motivations are the reasons individual have for behaving in a given manner and a given situation. He said, it exist as a part of one’s goal structures, one’s beliefs about what is important, and they determine whether or not one will engage in a given pursuit. According to Nevid, (2013) motivation are factors that activate, direct, and sustain goal – directed behaviour ... Motives are the “why” of behaviour – the needs or wants that drive behaviour and explain what we do. We don’t actually observed a motive; rather we infer that one exists based on the behaviour we observed. Motivation has also being seen as the force that initiates, guides and maintain goal – oriented behaviour (Kendal 2016). He said it is what causes us to take action, whether to grab a snack to reduce hunger or enroll in college to earn degree. He further explained that the forces that lie beneath motivation can be biological, social, emotional or cognitive in nature.

There are two distinct types of academic motivation interrelated in most academic setting they are intrinsic and extrinsic motivation. Academic intrinsic motivation is the drive or desire of the student to engage in learning “for its own sake”. It also the motivation that arise within the individual, such as doing a complicated crossword puzzle purely for the personal gratification of solving a problem. Students who are intrinsically motivated engage in academic tasks because they enjoy them. They feel that learning is important with respect to their self-image, and they seek out learning activities for the sheer joy of learning (Middleton, 1993). Their motivations tend to focus on learning goals such as understanding and mastery of mathematical concepts (Ames & Archer, 1988; Duda & Nicholls, 1992; Dweck, 1986). When a learner engage in tasks in which they are motivated intrinsically, they tend to exhibit a number of pedagogically desirable behaviour including increased time on task, persistence in the face of failure, more elaborative processing, monitoring of comprehension, selection of deeper, more difficult tasks, greater creativity, risk taking, more efficient performance and learning strategies. (Lepper, 1988).

Extrincts motivations are those that arise from outside of the individual and often involve some rewards such as trophies, money, social recognition or praises. Students who are extrinsically motivated engage in academic tasks to obtain reward (e.g. good grade, approval) or to avoid punishment (e.g. bad grades, disapproval). These students’ motivations tend to center on such
performance goals as obtaining favourable judgment of their competence from teachers, parents, and peers or avoiding negative judgment of their competence (Ames, 1992; Ames & Archer, 1988; Duda & Nicholls, 1992; Dweck, 1986). However, since teacher’s role is to disseminate the knowledge of instructional contents to the learner, it becomes teacher’s task to discover, initiate and sustain students’ motivation to learn and to encourage them to engage in learning activities (Aminu, 2013).

If there are needs to investigate and assess the educational system in order to improve its performance, impact of one component on the other must be examined. It is based on this; the present study is examining the impact of motivation on student’s academic achievement in mathematics. Until there is evidence of improvement in interest and performances of the learners in the subject particularly at the secondary school level research on Mathematics academic achievement should be considered a continuous process.

Motivation and Mathematics

In making instruction interesting in learning mathematics, there is need to use educational input (human and material resources) that will make the learning of mathematics, active, investigative and adventurous as much as possible. Such human and material resources must be ones that take into account, learner’s differences and attitudes towards mathematics as a subject. Examples could be the use of qualified and competent teacher’s, programmed learning texts, use of concrete materials and other instructional devices, which are manipulated. Also, mathematics exercises in form of various pencil and paper activities should be used to enhance self-esteem of learners, which will in turn improve attitude of such pupils, it is recommended that varying activities (game activities), which has been designed to contain mathematics problems ranging from easy to very difficult, should be used. For instance, in teaching addition at the primary school level, learning activities could be centred around foods like snacks for example, I got five sweets from mummy and three from daddy how many sweet do I have and so on. Also, in teaching geometry, the teachers could make models of different shapes with card board or wood. This would enable pupils to visualize two and three dimensional shapes correctly and thus find it easy to discover properties of these shapes. It is also necessary when teaching the process of mathematical rules for finding length, area, and volume, to encourage pupils to make nets of different shapes. The teachers can also demonstrate how such nets could be made to pupils and then encourage them to make their own. Such nets could then be used to explain how surface areas and volume of shapes are obtained.

The teaching of statistics at this level should essentially be made practical. Pupils should be encouraged to collect data from their environment so as to let them see the relevance of statistics to our everyday life. For instance, pupils could be asked to collect data on their age, the numbers of sibling they have, the months they are born. etc. it is also important for teachers at these levels to put into consideration the linguistics ability of the pupils and take pains to explain vividly the meaning of new words, signs, and symbols. By so doing, his pupils will understand his/her lesson better and so on. When an activity is designed with its central feature being an admired situation, experience or individual, At least each pupil no matter their ability level would be able to answer
some questions correctly. All these would help to motivate learners towards learning.

**Statement of the problem**

Mathematics has been perceived as a problematic subject among the students’. This assertion is supported by the observations and reports from examining bodies that a higher percentage of secondary school students continue to perform poorly in mathematics examinations. This poor performance continues to generate much concern among parents, teachers, students and other stakeholders in the education circle. This public outcry and deep concern by the stakeholders over the increasing failure rates of students in mathematics at both internally and externally conducted examinations therefore, deemed it necessary to examine the influence of motivation on students’ academic performance in Mathematics, this is because the knowledge of Mathematics remains one of the compulsory subjects for all citizens if they must effectively function in present day society.

**Significance of the Study**

In a country like Nigeria, where many jobs demand some level of mathematical sophistication, knowledge of mathematics is needed to obtain a desired position in the work force. It should also be noted that the end of the secondary school is the beginning of identification of potential and how far a student can go in pursuit of his/her academic career. The outcome of this study with respect to the selected variable investigated would therefore be significantly used as a pointer by researchers, and other stakeholder in educational sectors since it provides additional empirical data for a better understanding on how to improve students’ performance in mathematics.

**Hypotheses**

In this study, three null hypotheses were tested for significance level at 0.05 margin of error. They are:

1. There is no significant main influence of motivation on students’ academic performance in Mathematics.
2. There is no significant main influence of gender on students' academic performance in Mathematics.
3. There is no significant interaction influence of motivation and gender on students' academic performance in Mathematics.

**Design**

This study adopts the ex-post facto survey. This was deemed suitable because the study went out to gather information that already existed among the population under study.

**Population**

In the conduct of this research, the target population consists of all the Senior Secondary School Students (SS2) in Ogun East Senatorial District in Ogun State, Nigeria.

**Sample and Sampling Techniques**

The sample for this study consists of Three hundred and sixty (360) Senior Secondary School Students (SS 2) which were selected by simple random sampling from eighteen (18) schools in Ogun East Senatorial District, Ogun State. Ogun East Senatorial District comprises of nine local government areas out of the twenty (20) local government areas in Ogun State, Nigeria. The list of all schools in the zone were collected and two (2) schools randomly selected from each local
government after which twenty (20) students were randomly selected from each selected school.

**Research instruments**

The research instruments for this study were structured questionnaire and Mathematics Performance test. **Questionnaire:** The questionnaire consist two sections. In Section A, the participants were required to complete their personal profiles. Section B included their rating on how well they were motivated in doing mathematics, which has the greatest influence on their mathematics performance. **Mathematics Performance Test:** this the second part of the instrument; this test contained twenty questions selected from past questions paper from the Senior School certificate Examinations. It is an objective test with multiple choice answers. There were four option for each question labeled A – D. they were expected to circle the correct option. This is to measure their ability in mathematics.

**Validity of the Instrument**

To ensure the validity of the study copies of the drafted questionnaire and Mathematics Performance test were given to two experts in the subject area being covered in the study to ensure that the questionnaires and Mathematics Performance test were error free and measures what it is supposed to measure before final administration.

**Reliability of the Instrument**

The reliability of the instruments were determined using a test retest method in which a pilot test was conducted on thirty six students apart from those in the samples but under similar conditions. The instruments were administered again after two weeks interval on the same sets of the students. The results of the two tests and response to the questionnaire were subjected to a cronbach alpha reliability test to determine the degree of consistency of the instrument. An alpha value of 0.86 makes the questionnaire reliable and 0.75 make students Mathematics Performance test reliable. This shows that the instrument is very good.

**Data collections and Data analysis**

The instruments were administered through the assistance of the mathematics teachers in the participating schools. The respondents were adequately informed of the purpose of the research and the need to respond objectively. The Questionnaire was first administered to determine whether the respondents’ motivational level towards Mathematics would match their subsequent performance in Mathematics. After retrieving the first instrument, the MPT was then administered and retrieved after the expiration of 45 minutes allowed. The respondents’ responses in the two instruments were scored and collated for analysis. The data were analyzed using descriptive statistics such as frequency counts, percentages, mean, standard deviation while, the inferential analysis were (Two Way ANOVA) analysis of variance statistics, tested at 0.05 level of significance.
Table 1: Descriptive Statistics of Participants’ in Mathematics Performance Test

<table>
<thead>
<tr>
<th>Motivational Level</th>
<th>Gender</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Motivation</td>
<td>Male</td>
<td>3.8500</td>
<td>2.27312</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.4444</td>
<td>1.76325</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.6170</td>
<td>2.00057</td>
<td>188</td>
</tr>
<tr>
<td>A fair Amount of Motivation</td>
<td>Male</td>
<td>10.8254</td>
<td>2.42660</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10.7333</td>
<td>2.94958</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>10.7870</td>
<td>2.64416</td>
<td>108</td>
</tr>
<tr>
<td>Well Motivated</td>
<td>Male</td>
<td>14.8056</td>
<td>1.93936</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>15.6786</td>
<td>1.21879</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.1875</td>
<td>1.70783</td>
<td>64</td>
</tr>
<tr>
<td>Total</td>
<td>Male</td>
<td>8.5084</td>
<td>4.97564</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>7.1492</td>
<td>5.19239</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.8250</td>
<td>5.12408</td>
<td>360</td>
</tr>
</tbody>
</table>

The result in Table 1 revealed a total mean mathematics performance score of 7.8250 with a standard deviation of 5.12408. However, a mean mathematics performance score of 3.6170 and a standard deviation of 2.00057 were observed for participants’ with no motivation. For participants with a fair amount of motivation, a mean of 10.7870 and a standard deviation of 2.64416 were observed. For well - motivated students’, a mean mathematics performance score of 15.1875 and a standard deviation of 1.70783 were observed. A mean score of 8.5084 and a standard deviation of 4.97564 were observed for mathematics performance score of male participants. For female participants, a mean mathematics performance score of 7.1492 and a standard deviation of 5.19239 were recorded.

Table 2: Tests of Between-Subjects Impact of Motivation and Gender on Students Mathematics Performance Test

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>7765.483</td>
<td>5</td>
<td>1553.097</td>
<td>331.104</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>28544.901</td>
<td>1</td>
<td>28544.901</td>
<td>6085.482</td>
<td>.000</td>
</tr>
<tr>
<td>Motivational Level</td>
<td>7590.555</td>
<td>2</td>
<td>3795.277</td>
<td>809.114</td>
<td>.000</td>
</tr>
<tr>
<td>Gender</td>
<td>1.142</td>
<td>1</td>
<td>1.142</td>
<td>.244</td>
<td>.622</td>
</tr>
<tr>
<td>Motivational Level * Gender</td>
<td>19.179</td>
<td>2</td>
<td>9.589</td>
<td>2.044</td>
<td>.131</td>
</tr>
<tr>
<td>Error</td>
<td>1660.492</td>
<td>354</td>
<td>4.691</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31469.000</td>
<td>360</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>9425.975</td>
<td>359</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The results in Table 2 showed that there is significant main influence of motivation ($F(2, 354) = 809.114; p < 0.05$) on participants’ mathematics performance score; while there was no significant main influence of Gender ($F(1, 354) = .244; p > 0.05$). Also, there was no significant two-way interaction influence of motivation and gender ($F(2, 354) = 2.044; p > 0.05$) on participants’ mathematics performance score.

**Discussion of Findings**

The result of the first hypothesis shows that secondary school students differ significantly in their academic achievement based on the extent to which they were motivated. This showed that students’ motivational level really has to do with their academic performance. That is, highly motivated students would actually perform better academically than the students’ with a fair amount of motivation followed by students who were not motivated at all. This finding is corroborated with that of Bank and Finlapson’s (1980) who stressed that successful student have significant higher motivation for achievement than unsuccessful students. Similarly, the report by Tella (2007) revealed significant difference when motivation was taken as variable of interest on academic achievement in mathematics based on the degree of their motivation. Abouserie (1995) also point out that a significant positive correlation between students’ achievement motivation and their scores on comprehension learning, meaning orientation, and methodical study was found, which suggest that students with high achievement motivation are likely to adopt deep and elaborative approaches in their English readings.

This finding is also consistent with Broussard (2004) who states that higher levels of mastery motivation are found to be related to high achievement in third graders and first graders. In Bernardo’s (2008) mastery and performance goals were positively associated with academic achievement, personal performance standards, and parent-oriented achievement motivation. In a meta-analysis of the relationship between achievement motivation and performance and career choice a significant correlation is found (Collins, Hanges, and Locke, 2004). Many of the researchers have concluded that students’ achievement motivation have positive effects upon their scores. Therefore, it could be suggested that motivation have an important effects on academic achievement, and also is important components of educational and instructional processes.

The result of the second hypothesis, which compares the influence of gender on academic performance of secondary school students in Mathematics, is found to be insignificant. This finding is in line with Siana et. al. (1998) that Asian students’ of both sexes rated parents and friends as more importance in contributing to academic success. Also, Awan, Noureen, Naz, (2011) revealed Significant gender differences in favour of girls. The variation in the present result on this study may be connected with the issue of environment. Meanwhile, one thing that should be very clear is the fact that success in school subject or academic generally depend on many motivating factors. The issue of gender is part of it likewise parental involvement/support and or peer influence. All these should not be underrated because they are factor that can make student achievement in school.

The results of the third hypothesis, which compare the interaction level of motivational and gender, showed that there was no two-way interaction effect between motivation and gender. This result is in disagreement with the finding of Tella (2007)
who showed that gender difference were significant when impact of motivation on academic achievement was compared in male and female students among Nigerian students.

**Conclusion**

Based on the findings of this study, it could be concluded that motivation is related to performance in Mathematics and that gender has no influence on Mathematics. The findings reported in this study justify the importance of motivation to students’ academic performance. It is therefore, hoped that these findings will serve as resource materials for mathematics educators, mathematicians, school authorities psychologists, counselors, government, parents and significant others who are concerned with the academic progress of the students’

**Recommendations**

1. Mathematics educators in teacher education institutions should pay greater attention to the ways in which prospective secondary school mathematics teachers can enhance students’ motivation to learn mathematics. Using a variety of instructional approaches and media, they can show them, for instance, how to plan and enhance for motivation in mathematics lessons, and how to evaluate mathematics learning and give feedback to students effectively.

2. Parents and teachers should consciously work on their students’ attitude towards school and the different school subjects as this will directly impact their academic performance in various school subjects.

3. Secondary school mathematics teachers could enhance their students’ motivation to learn mathematics by creating students’ interest in mathematics, making it relevant to them and increasing their probability of success and satisfaction during mathematics instruction.

4. Trained teachers’ who know what they are doing and are interested in the students’ improvement should be employed to teach.

5. Schools should give award to students’ who perform well as this will motivate others students’

**References**


