THE IMPACT OF MOTIVATION ON
STUDENTS’ ACADEMIC ACHIEVEMENT IN KEBBI
STATE JUNIOR SECONDARY SCHOOL MATHEMATICS

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ABSTRACT
Individual characteristics such as intelligence, cognitive styles, and personality play an important role in learning and instruction as does the context of learning. In the effort to improve students cognition and affective outcomes in mathematics and/or school learning, educational psychologists and mathematics educators, have continued to search for variables (personal and environmental) that could be manipulated in favor of academic gains. Of all the personal and psychological variables that have attracted researchers in this area of educational achievement, motivation seems to be gaining more popularity and leading other variables. It is based on this background that the study investigated the impact of motivation on students’ academic achievement in Kebbi state junior secondary schools mathematics. An ex-post facto design was used in the study. The population consisted of 137,914 junior secondary school students in Kebbi state out of which 383 students were sampled. Two hypotheses were tested at 5% level of significant. Results were analyzed using mean, standard deviation, t-test and ANOVA. From the findings, results showed that gender difference were significant when impact of motivation on academic achievement was compared in male and female students. Also other result indicates that there is significant difference in the academic achievement of highly motivated and lowly motivated students in mathematics. The study recommended among others that individual differences in ability, background and attitude must be taken into consideration.

Keywords: Motivation, academic achievement, mathematics, junior secondary school students.
INTRODUCTION

Mathematics has the ability to confuse, frighten, and frustrate learners of all ages. If a child has a negative experience in mathematics, that experience has the ability to affect his/her attitude toward mathematics as an adult. Okereke [1] stated that mathematics is the science of things that have a pattern of regularity and logical order and finding and exploring the regularity. Mathematics is the foundation of science and technology and the functional role of mathematics to science and technology is multifarious, that no area of science, technology and business enterprise escapes its application. The importance of mathematics in the world cannot be over-emphasized. There is a general consensus among educators, that mathematics is an important and useful subject for development in every country. The use of mathematics has been with man even before the introduction of formal education; Sambo [2].

Besides its importance it is observed that mathematics is one of the most poorly taught, widely hated and abysmally understood subject in elementary schools. Students particularly girls run away from the subject. He further attributed students’ poor performance to factors such as the society view that mathematics is difficult, shortage of qualified teachers, lack of mathematics laboratory and lack of attractiveness and novelty in teaching method. The obvious question is whether students’ failure to learn mathematics can be ascribed to problems of curriculum, problem of teaching, or the student, or perhaps the combination of these; Carnine [3]. There are many possible reasons as to why students fail in
mathematics. But most of the reasons are related to curriculum and methods of teaching rather than the students’ lack of capacity to learn; Jones, Wilson & Bhaswani [4]. Various factors have been adduced for poor performance of students in mathematics. The interest of students in mathematics have been related to the volume of work completed, students task orientation and skill acquisition, students personality, shortage of qualified mathematics teachers, poor facilities, equipment and instructional materials for effective teaching Odogwu [5].

In making instruction interesting in learning mathematics, there is need to use methods/strategies and material/media which will make the learning of mathematics, active, investigative and adventurous as much as possible. Such methods also must be ones that take into account, learner’s differences and attitudes towards mathematics as a subject. Examples could be the use of programmed learning texts, use of concrete materials and other instructional devices, which are manipulated. 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. This would go a long way to motivate such pupils towards further learning. When an activity is designed with its central feature being an admired situation, experience or individual, it would go a long way in motivating, pupils to learn mathematics. For example, in teaching addition at the primary school level, you could centre learning
activities around foods like snacks (for example, I got two sweets from mummy and four from daddy how many sweet do I have and so on). All these suggestions would help to motivate learners towards learning. However, one strategy, which has been observed to bring about motivation of learners to learn mathematics, is the use of game based strategy; Aremu [6].

Moreover, individual characteristics such as intelligence, cognitive styles, and personality play an important role in learning and instruction as does the context of learning. Other research findings have shown that individual students’ characteristics variables such as motivational orientations, self-esteem and learning approaches are important factors influencing academic achievements.

In the effort to improve students’ cognition and affective outcomes in mathematics and school learning, 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 seems to be gaining more popularity and leading other variables; Aire & Tella [7]. The issue of motivating learners is seen as an important aspect of effective learning. In fact psychologists believe that motivation is a necessary ingredient for learning; Biehler and Snowman [8]. They believe that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn; Fontana [9]. These issues of motivation of students in education and the impact on academic performance are considered as an important aspect of effective
learning. However, a learner’s reaction to education determines the extent to which he or she will go in education. The impact of motivation on education of mathematics of a child cannot be undermined. That is why Hall [10] believes that there is a need to motivate pupils so as to arouse and sustain their interest in learning mathematics. “Motivation raises question on why people behave in the way they do it”. An individual could therefore, from psychologists’ point of view, be seen as politically, socially and academically motivated depending on the motive behind his or her activities. Hence, this study intends to investigate the impact of motivation on student’s academic achievement in mathematics.

1.1 Statement of the Problem

Perhaps, it is in realization of the importance of mathematics that it is made compulsory at primary and secondary levels of education besides admission into higher institutions and professional institutions. In Nigeria, students poor performance in mathematics have been attributed to lack of motivation, poor teaching methods, unqualified and inexperienced teachers, poor student attitude toward mathematics, poor learning environment and gender effect Ivowi [11]. It is against this background that the researchers investigate the role of motivation on student’s academic achievement in junior secondary school mathematics.

1.2 Objectives of the Study

The study intends to achieve the following objectives:

i. To determine the effect of motivation on academic performance of male and female students in mathematics.
ii. To compare the academic performance of highly motivated and lowly motivated students in mathematics achievement test.

1.3 Research Questions

In line with the objectives of the study, the following research questions were raised in this study:

i. Is there any difference in the impact of motivation on academic performance of male and female students in mathematics?

ii. Is there any difference in the academic performance of highly motivated and lowly motivated students in mathematics achievement test?

1.4 Research Hypotheses

The following null hypotheses were formulated and tested at 5% level of significance.

\( H_{01} \): There is no significant difference in the impact of motivation on academic performance of male and female students in mathematics.

\( H_{02} \): There is no significant difference in the academic performance of highly motivated and lowly motivated students in mathematics achievement test.
2 METHODOLOGY

2.1 Research Design

This study adopted a pure quantitative method using an ex-post facto design in which the researcher does not have direct control over independent variable because their manifestations have already occurred.

2.2 Population of the Study

The population of this study is all the junior secondary school students in Kebbi state. There are one hundred and thirty seven thousand nine hundred and fourteen (137,914) students in which 83,437 are male and 54,477 are female students. The statistics were supplied by the State Secondary Education Management Board (SSEMB).

Table 1: Population of the Study

<table>
<thead>
<tr>
<th>S/N</th>
<th>Educational Zone</th>
<th>Number of schools</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BirninKebbi</td>
<td>34</td>
<td>15,577</td>
<td>9,475</td>
<td>25,052</td>
</tr>
<tr>
<td>2</td>
<td>Yauri</td>
<td>20</td>
<td>12,315</td>
<td>7,481</td>
<td>19,796</td>
</tr>
<tr>
<td>3</td>
<td>Argungu</td>
<td>23</td>
<td>14,697</td>
<td>9,415</td>
<td>24,112</td>
</tr>
<tr>
<td>4</td>
<td>Zuru</td>
<td>19</td>
<td>13,977</td>
<td>8,163</td>
<td>22,140</td>
</tr>
<tr>
<td>5</td>
<td>Bagudo</td>
<td>27</td>
<td>11,138</td>
<td>9,071</td>
<td>20,209</td>
</tr>
<tr>
<td>6</td>
<td>Gwandu</td>
<td>15</td>
<td>7,603</td>
<td>4,353</td>
<td>11,956</td>
</tr>
<tr>
<td>7</td>
<td>Bunza</td>
<td>24</td>
<td>8,130</td>
<td>6,519</td>
<td>14,649</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>162</strong></td>
<td><strong>83,437</strong></td>
<td><strong>54,477</strong></td>
<td><strong>137,914</strong></td>
</tr>
</tbody>
</table>

Source: [Kebbi State Secondary Education Management Board, 2012].
2.3 Sample for the Study

The researcher adopted a purposive sampling technique in selecting the schools and the level of the students from which the sample size was drawn. The respondents were randomly drawn from a group of junior secondary school three (JSS3) students in four schools. The schools are: Army Day Secondary School Birnin Kebbi, Sama Secondary School Argungu, Government Day Secondary School Yauri and Government Science and Technical College Zuru. A total of three hundred and eighty three (383) participants were taken as the sample size as suggested by Krejcie and Morgan [12]. Out of the 383 respondents, 213 were males and 170 were females.

Table 2: Sample selected for the study

<table>
<thead>
<tr>
<th>S/N</th>
<th>Name of School</th>
<th>Location</th>
<th>Males</th>
<th>Females</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Army Day Secondary School</td>
<td>B/Kebbi</td>
<td>51</td>
<td>46</td>
<td>96</td>
</tr>
<tr>
<td>2</td>
<td>Sama Secondary School</td>
<td>Argungu</td>
<td>-</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>3</td>
<td>Government Science and Technical College</td>
<td>Zuru</td>
<td>96</td>
<td>-</td>
<td>96</td>
</tr>
<tr>
<td>4</td>
<td>Government Day Secondary School</td>
<td>Yauri</td>
<td>66</td>
<td>29</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>213</td>
<td>170</td>
<td>383</td>
</tr>
</tbody>
</table>

4 Instrumentation

Instrumentation involves careful selection of adequate and appropriate tool(s) which are administered in order to collect relevant data concerning the study. The instrument used in gathering data for this study was a close-ended questionnaire named the impact of motivation on student’s academic achievement (IMSAA). The research hypotheses served as the controlling factor
in preparing the questionnaire, this was to ensure that the items in the questionnaire reflect on the hypotheses of the study. The questionnaire contains 25 items and it is made up of two sections. Section A was design to elicit information on the demographic data of the respondents while section B was design to elicit information on impact of motivation on student’s academic achievement. The instrument is based on four point modified likert scale of strongly agree (SA), Agree (A), Disagree (D), Strongly disagree (SD). In scoring the items, respondents would have a possible score ranging from 4-1 which represents his/her opinion on each item. The higher the score, the more influenced the respondent is by the item. The highest possible score is 100 while the lowest score is 25 and the range of the score is 75. The mid-point score is 37.5. The cut-off point is from 62.5 to 100. Thus, respondents who obtained scores from 62.5 to 100 were considered as having positive motivation while those respondents who obtained scores below 62.5 were considered as having negative motivation towards mathematics education. The instrument was administered by the researcher with the help of some research assistants.

4.1 Validity and Reliability of the Research Instrument

The instrument was validated by experts at the department of science education, Ahmadu Bello University Zaria, Kadunastate Nigeria. A trial testing of the instrument was carried out on a sample of 40 students of JSS3 students who were not part of the targeted sample but part of the population. A test-retest method was employed in establishing reliability for the instrument. By means of
Pearson product moment correlation, a reliability coefficient of 0.84 was achieved. This reliability coefficient showed that the instrument was reliable for use.

5 PROCEDURE FOR DATA ADMINISTRATION AND COLLECTION
The questionnaire was administered to 383 students out of which 375 filled and returned the questionnaire. Data collections were done immediately and are marked fairly and honestly by the researcher. The lists of the scores of students were prepared by the researcher.

5.1 Procedure for Data Analysis
Scores obtained from the test were presented in tabulator form using SPSS (software) version 17.0 for data storage and for data calculation. The data obtained from the study were statistically analyzed using t-test and analysis of variance (ANOVA) at 5% level of significance.

6 RESULTS

**H01**: There is no significant difference in the impact of motivation on academic performance of male and female students in mathematics.

**Table 3: t-test Showing the Mean Difference in the Impact of Motivation on Academic Achievement of Male and Female Students in Mathematics.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>S. D.</th>
<th>Std. Error</th>
<th>Df</th>
<th>t-cal.</th>
<th>t-crit</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>225</td>
<td>55.096</td>
<td>19.512</td>
<td>51.127</td>
<td>373</td>
<td>15.802</td>
<td>1.968</td>
<td>0.05</td>
</tr>
<tr>
<td>Female</td>
<td>150</td>
<td>32.013</td>
<td>13.792</td>
<td>38.792</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S* - Significant at 0.05 level, Df = 373
Table 3 indicates the results of the analysis conducted on the impact of motivation on academic achievement in mathematics based on gender. The table clearly revealed that t-calculated is 15.802 while t-critical is 1.968 at 0.05 level of significant. This shows that t-cal. is greater than t-crit., therefore the null hypothesis is rejected; this implies that there is significant difference in the impact of motivation on academic performance of male and female students in mathematics.

**H₀₂**: There is no significant difference in the academic performance of highly motivated and lowly motivated students in mathematics achievement test.

**Table 4: t-test Showing the Mean Difference in the Academic Performance of Highly Motivated and Lowly Motivated Students in Mathematics Achievement Test.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>S. D.</th>
<th>Std. Error</th>
<th>Df</th>
<th>t-cal.</th>
<th>t-crit</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly motivated</td>
<td>117</td>
<td>48.231</td>
<td>23.116</td>
<td>43.501</td>
<td>373</td>
<td>12.361</td>
<td>1.968</td>
<td>0.05</td>
</tr>
<tr>
<td>students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowly motivated</td>
<td>258</td>
<td>28.054</td>
<td>17.004</td>
<td>33.384</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S* - Significant at 0.05 level, Df = 373

Table 4 shows academic achievement measured alongside extent of motivation. From the table, it is clear that t-calculated is 12.361 while t-critical is 1.968 at 0.05 level of significant. Since t-cal. is greater than t-crit., the null hypothesis which states that; there is no significant difference in the academic performance of highly motivated and lowly motivated students in mathematics achievement
test is also rejected. This implies that there is significant difference in the academic achievement of highly motivated and lowly motivated students in mathematics.

**Table 5: Summary of Analysis of Variance (ANOVA) of Gender Difference and Academic Achievement in Mathematics.**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F-cal</th>
<th>F-tab</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>159.137</td>
<td>1</td>
<td>159.137</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>455.771</td>
<td>373</td>
<td>1.239</td>
<td>29.021</td>
<td>2.99</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>614.908</strong></td>
<td></td>
<td><strong>374</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*S* - Significant at 0.05 level, Df = 373

Table 5 indicates that F-calculated (29.021) is greater than F-table (2.99) at 0.05 level of significant. The source of variance between groups is 159.137 and source of variance within groups is 455.771 which clearly show a significant difference on gender and academic achievement.

**7 DISCUSSION OF RESULT**

The result of the first hypothesis, which compares the impact of motivation on academic achievement of junior secondary school students in mathematics using gender as a variable of interest is found to be significant. The findings show that motivation has impact on academic achievement of junior secondary school students of Kebbi state in mathematics with respect to gender. This finding is in disagreement with Siana, Genda, Lighbody, Pauline, Stock, Ruth and Walsh [13] findings that Asian students of both sexes rated parents and friends as more important in contributing to academic success. The variation in
the present result on this study and that of Siana et al. 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.

The result of the second hypothesis shows that junior secondary school students in Kebbi state differ significantly in their academic achievement based on the extent to which they are motivated. The results reveal that highly motivated students perform better academically than the lowly motivated students. This finding corroborates that of Aireand and Tella [7] and Bank and Finlapson [14] who stressed that successful students’ have significant higher motivation for achievement than unsuccessful students. Similarly, the report by Johnson [15] that academic achievement is highly correlated with student’s motivation lends a good support to the present findings. With reference to the position of Aremu [6] that when pupils express lack of interest in the subject, it affects the way they react or listen to the teacher. It can be said therefore that interest and attitude of learner towards a particular subject matters a lot. Moreover, when the students display good attitude and better interest in mathematics, the teacher is motivated and this may cause him to forget whatever hindrances to the teaching of the subject from his own part. Good impartation of mathematics knowledge on the part of the teacher; couple with student’s interest in the subject and the display of positive attitude as earlier pointed out, are good motivating factors
which when combine together is assumed will result to better achievement in mathematics.

8 CONCLUSION

The main contribution of this study provided the empirical evidences to show that motivation did have some impact on students’ performance in mathematics in terms of their understanding and applicability. On the basis of the findings, the following conclusions were drawn:

- Motivation has a significant impact on academic achievement of junior secondary school students in mathematics with respect to gender.
- Highly motivated students perform better academically than the lowly motivated students.

8.1 Recommendation

The following recommendations were made on the basis of the findings of this study:

- Make mathematics teaching interesting.
- Individual differences in ability, background and attitude must be taken into consideration.
- Enhance learners feeling of esteem by arranging varieties of learning experiences.
REFERENCES