

Impact of Motivation on Secondary School Students' Achievement in Mathematics

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ABSTRACT

The research study is an investigation to find out the impact of motivation on secondary school students achievement in mathematics in Ishielu local government area of Ebonyi state. To carry out this study, the researcher formulated three (3) research questions with three hypotheses to guide the study. The research design adopted for the study is survey research design, The population of the study consists of (5480) students, The sample for the study comprised 120 students randomly selected from six (6) secondary schools in Ishielu local government area. The researcher through questionnaires collected data for the study the data collected were analyzed using mean statistics. Testing of hypotheses were tested with t-test. From the analysis of the result; the following findings were made; The use of teaching aid in teaching and learning of mathematics motivate the student; qualify teachers who specialized in mathematics should be employed for effective teaching and learning of mathematics; Teachers and student interaction in the classroom will reduced the problem of poor academic achievement of students in mathematics; well-equipped mathematics laboratory and encouragement from parents will improve academic performance of secondary school students in mathematics. The implication of the findings was stipulated, recommendations which were based on the findings were made; and suggestions for further studies were clearly highlighted. Summary and conclusion were also stated.

Keywords: Investigation, Secondary School Students, and hypothesis.

INTRODUCTION

In the contemporary Nigeria, greater emphasis is being placed on Industrial and Technological development. As a result students are being encouraged to take up science related subjects. One subject that cut across all the sciences is mathematics. Today, mathematical activity literally every field of human endeavour plays a fundamental role in economic development of a country. In our march towards scientific and technological advancement, the students need nothing short of good performance in mathematics at all levels of schooling. Unfortunately performance of students in mathematics at the end of their school secondary education has not improved in the past decade [1]. 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 and self

concept [2], feeling of inadequacy [3], lack of motivation and self-confidence [4], anxiety [5], shortage of qualified mathematics teachers, [6]. [7], use of traditional chalk and talk methods, [8], large students to teacher ratio [9] mathematics fright/phobia [10] and so on. [11] stated that interest in activities tends to increase the likelihood that individuals formulate goals relating to that activity and invest time and effort to achieve them. 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 [12]. 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 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 [13]. All the above stated factors (poor facilities, lack of motivation and self confidence, shortage of qualified mathematics teachers and mathematics phobia), are persistent cause of failure in mathematics, which have been proffered. These causes of failure in mathematics shows relevance in one way or the other to the poor performance of students in mathematics. This has lead to a cycle of events that could be illustrated thus: When explaining the cause of failure in mathematics above [14] explained that; when students express lack of interest in the subject, it affects the way they react or listen to the teacher. And when many of the students believe that they cannot pass, the teacher is also affected. This is because aside of this negative response from the students, he/she as well is already being confronted by a lot of other factors (e.g., low income, low status in society, large teacher-students ratio) and so on. These may cause him or her to resorts to the easiest way of disseminating knowledge that is 'chalk and talk' without the use of instructional materials. He may not also bother to vary his teaching styles to suit individuals; therefore the cycle goes on [15]. One unfortunate outcome of this is that, the negative attitude towards the subject is passed down from one generation of students to another and therefore the cycle keeps enlarging. What then could be done to break such a cycle of failure? This has been the question by many mathematics educators and researchers [16]. A lot of new and modified old methodologies have been proposed to improve performance in the subject e.g., [17] etc. Instructional materials have

also been designed and developed to aid mathematics teaching and learning [18]. All these are to help break this cycle of poor performance by motivating students to learn mathematics. This 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 [19]. They believe that satisfactory' school learning is unlikely to take place in the absence of sufficient motivation to learn [20]. The issue as relating to mathematics education would then be, is it possible to motivate students to I earn mathematics? And how could it be done? One needs to therefore look at the effect of motivation on learning.

Statement of the problem

The issue of motivation of students in education and the impact on academic performance are considered as 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 students cannot be easily achieved. [21] believes that there is a need to motivate students 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 [22]. Based on the foregoing, research on Mathematics academic achievement should be considered a continuous process until there is evidence of improvement in interest and performances of the learners in the subject particularly the secondary school students. Essentially therefore, the present study is an effort in this direction. The problem of this study is to survey the impact of motivation on student's academic achievement in mathematics.

METHODOLOGY

Research Design

The research design adopted for the study is survey research design. It is one of the cheapest and quick ways of obtaining facts and figures from systematically selected segments of a population with the purpose of ascertain the general characteristics of the population [23].

Area of the Study

The area of the study is Ishielu local government area of Ebonyi State. Ishielu local government area is one of the local governments in Ebonyi State with its headquarter Ezillo. It is one of the local governments in Onueke education zone. Ishielu local government is bounded in the east by Nkanu cast local government area of Enugu state, in west by Ohaukwu local government area of Ebonyi state, in the North by Ado local government area of Benue state and in south by Onicha and Ohaozara local government areas of Ebonyi State.

Population of the Study

The population of this study consists of SS II students in the government approved secondary school in Ishielu local government area of Ebonyi State. The school consists of five thousand four hundred and eighty (5480) students (Ishielu local government education board Onueke education zone. 2015).

Sample and Sampling Techniques

The study made use of 120 students as the sample. Because of the large population of the students stated above, six schools was randomly selected using simple random sampling by balloting. The schools include community secondary school Ntezi, saint Paul secondary school Ntezi. community secondary school Okpoto, comprehensive secondary school Ezillo, madonna secondary school Nkalagu, saint Augustine secondary school Bzza-Umuezekoha, twenty (20) students were selected from each school by balloting with replacement to give the sample size of one hundred and twenty.

Instrument for Data Collection

For necessary information about the research to be obtained, a questionnaire is the sole instrument used for data

collection. The questionnaire is made of two sections, part "A" and part "B" part A dealt with the personal data of the respondents such as name of school, sex, age and class. While part B contains fifteen items base on the research questions.

Validation of Instrument

Validity is simply the appropriateness of an instrument in measuring what is intended to measure [24]. To ensure that the items in the questionnaire address the topic of the research, two experts in science education, one experts in mathematics education as well as one expert in computer education and one expert in measurement and evaluation unit of science education were given the draft copies of the questionnaires for face and content validity. They examined it, made necessary corrections and discard irrelevance items with respect to the project topic, their corrections were duly effected in the instrument.

Reliability of Instrument

To ensure the internal consistency of the instrument, lest-retest method was used in doing this, the researcher administered the instruments to the small group of one hundred twenty (120) respondents. The researcher used the data collected from the trial testing on the fifteen items questionnaire to carryout a reliability analysis testing using kuder richardson approach and it yielded alpha of 0.63.

Method of Data Collection

To facilitate effective data collection, the researcher travelled to the various schools with the copies of the questionnaires, one hundred and twenty copies questionnaires were distributed to the respondents who filled and then submitted. Each respondent filled his/her own questionnaire which was given back to the researcher at the end. No questionnaire was lost, all were returned.

Method of Data Analysis

In analyzing the data, the researcher used mean score to answer the research questions that guided the study and t-test to test the hypotheses, calculating the mean, four points rating scale is given the following value by the researcher.

Strongly agree (SA) = 4points
 Agree (A) = 3points
 Disagree (D) = 2points
 Strongly disagree (SD) =1 point

N= sample size

$$X = \frac{4+3+2+1}{4} = \frac{10}{4} = 2.5$$

With the formula $x = \frac{\sum FX}{N}$

Where x = mean
 \sum = Summation
 F = Frequency observation

Decision Rule:

After computation of a mean above, a mean of 2.5 was obtained and this serves as a Benchmark for acceptance or rejection. Thus any items with the mean below 2.5 are rejected, while items with the mean of 2.5 and above are accepted.

DATA PRESENTATION AND RESULTS ANALYSIS

Research question one

What are the various strategies for motivating secondary school students in mathematics?

Table 1: mean result on the various strategies for motivating secondary school students in mathematics.

S/N	Items	SA	A	D	SD	N	FX	X	Decision
1	A self-placed program for students is strategy for motivating student in mathematics	50	40	20	10	120	370	3.08	Accepted
2	Use of teaching aid in teaching of mathematics is strategy for motivating students in mathematics	40	30	28	22	120	328	2.73	Accepted
3	Does reward strategy for motivating students in mathematics.	60	35	15	10	120	385	3.20	Accepted
4	Use of game/simulation in teaching and learning of mathematics a strategy for motivating students in mathematics	65	25	16	14	120	381	3.17	Accepted
5	Assessment process in the classroom a strategy in motivating students in mathematics	70	30	12	8	120	402	3.35	Accepted
Grand mean								3.10	

The data presented in the table one above showed that all of the stems were accepted because they had mean above 2.5 and grand mean of 3.10 which were above the cutoff point 2.5 indicating that the respondents agreed that those items were the various strategies for motivating

secondary school students in mathematics.

Research question two

What are the factors affecting the achievement of secondary school students in mathematics?

Table 2: Mean result on the factors affecting the achievement of secondary school students in mathematics.

S/N	Items	SA	A	D	SD	N	FX	X	Decision
1	Student belief about learning can affect their achievement in Mathematics	66	34	14	6	120	400	3.33	Accepted
2	Lack of teaching aid affect the students achievement in Mathematics	68	32	15	5	120	403	3.36	Accepted
3	Lack of quality teachers affect the achievement of students in Mathematics	69	31	16	4	120	405	3.38	Accepted
4	Socio-economic status of parents affects the achievement of students in mathematics	60	30	20	10	120	380	3.17	Accepted
5	Content of curriculum affect the students academic achievement in mathematics	55	35	18	12	120	373	3.10	Accepted
	Grand mean							3.27	

The data presented in the table two above showed that all of the items were accepted because they had mean above 2.5 and grand mean of 3.27 which were above the cutoff point 2.5 indicating that the respondents agreed that those items were the factors affecting the

achievement of secondary school students in mathematics.

Research question three

What are suggested solutions to the problem of poor academic achievement of secondary school students in mathematics?

Table 3: mean result on the suggested solutions to the problem of poor academic achievement of secondary school students in mathematics.

S/N	Items	SA	A	D	SD	N	FX	X	Decision
1	Adequate teaching aid assist in solutions to the problem of poor academic achievement of students in mathematics	50	30	25	15	120	355	2.95	Accepted
2	Qualify teachers helps the solutions of poor academic achievement of student in mathematics	45	35	26	14	120	351	2.93	Accepted
3	Teachers and students interaction in the classroom is possible solution to the	58	32	17	13	120	375	3.12	Accepted

4	problem of poor academic achievement of students in mathematics. Well-equipped mathematics laboratory can improve poor academic achievement of students in mathematics.	57	33	19	11	120	376	3.13	Accepted
5	Encouragement from parents is a solution to the problem of poor academic achievement of students in mathematics.	48	42	21		120	369	3.08	Accepted
	Grand mean							3.04	Accepted

The data presented in the table three above showed that all the items were accepted because they had mean above 2.5 and grand mean of 3.04 which were above the cutoff point 2.5 indicating that the respondents agreed that those items were the suggested solutions to the problem of poor academic

achievement of secondary school students in mathematics.

Hypothesis: H₀,

There is no significant difference between the mean responses of student's on various strategies for motivating secondary school students in mathematics.

Table 4: T-test analysis between various strategies and motivating students.

S/N	Variable	No of pairs	X	SD	DF	t,cal	t,crit	Decision
1	Various strategy motivating students	120	2.95 2.73	1.06 1.11	119	1.59	1.96	Accepted
2	Various strategies motivating students	120	3.17 3.10	0.99 1.00	119	0.56	1.96	Accepted
3	Various strategies motivating Students	120	3.13 3.12	1.01 1.03	119	0.0"	1.96	Accepted
4	Various strategies motivating Students	120	3.10 3.08	0.94 0.96	119	0.16	1.96	Accepted
5	Various strategies Motivating	120	3.35 3.33	0.89 0.87	119	0.17	1.96	Accepted

Students							
t-test value					0.51	1.96	Accepted

Data from table four showed that the t_{cal} is less than t_{crit} ($0.51 < 1.96$). hence, the null hypothesis is uphold. This means that there is no significance difference between the mean responses of students on the various strategies; for motivating secondary school students in mathematics.

Hypothesis: H_0 ,
There is no significance difference between the mean responses of student's on factor affecting the achievement of secondary school students in mathematics.

Table 5: T-test analysis between factors affecting and students achievement

S/N	Variables	No of pairs	X	SD	DF	t,cal	tcrit	Decision
1	Factors affecting students achievement	120	3.38 3.36	0.84 0.86	119	0.18	1.96	Accepted
2	Factors affecting students achievement	120	3.17 2.93	1.05 1.03	119	1.79	1.96	Accepted
3	Factors affecting students achievement	120	3.14 3.07	0.93 1.01	119	0.56	1.96	Accepted
4	Factors affecting students achievement	120	3.41 3.40	0.88 0.86	119	0.09	1.96	Accepted
5	Factors affecting students achievement	120	3.53 - 3.46	0.74 0.84	119	0.67	1.96	Accepted
t-test value						0.66	1.96	Accepted

Data from table five showed that the t_{cal} is less than t_{crit} ($0.66 < 1.96$). hence the null hypothesis is uphold. This means that there is no significance difference between the mean responses of student's on the factors affecting the achievement of secondary school students in mathematics.

Hypothesis: H_0 ,
There is no significance difference between the mean responses of student's on suggested solutions to the problem of poor academic achievement of secondary school students in mathematics.

Table 6: T-test analysis between responses of students and problem of poor academic achievement.

S/N	Variables	No of pairs	X	SD	DF	t,cal	t,crit	Decision
1	Response of students problem of poor academic achievement.	120	3.55 3.54	0.72 0.69	119	0.11	1.96	Accepted
2	Response of students problem of poor academic achievement	120	3.48 3.47	0.77 0.78	119	0.10	1.96	Accepted
3	Response of students problem of poor academic achievement	120	3.5 3.48	0.67 0.85	119	0.2	1:96	Accepted
4	Response of students problem of poor academic achievement	120	3.4 3.25	0.71 0.89	119	1.43	1.96	Accepted
5	Response of students problem of poor academic achievement	120	3.08 3.04	0.87 0.97	119	0.34	1.96	Accepted
	t-test value					0.44	1.96	Accepted

Data from table six showed that the t,cal is less than t,crit ($0.44 < 1.96$). Hence, the null hypothesis is uphold. This means that there is no significance difference between the mean responses of student's

on the suggested solutions to the problem of poor academic achievement of secondary school students in mathematics.

SUMMARY OF FINDING

The summaries of finding are as follows:

1. There are various strategies for motivating secondary school students in mathematics.
2. There are factors affecting the achievement of secondary school student's mathematics.
3. There are suggesting solutions to the problem of poor academic achievement of secondary school students in mathematics.

Discussion of Findings

The result of hypothesis one which compared the various strategies for motivating secondary school students in mathematics using items as a variable of interests is found not to be significant. The finding shows that motivation has various strategies for motivating secondary school students in mathematics. Meanwhile, what should be very clear is the fact that success in mathematics or academic generally

depends on many motivating factors. The issues of students academic achievement is part of parental involvement/support and or peer influence. All these should not be underrated because they are factors that can hinder student achievement in school.

The result of hypothesis two shows that there is no significance difference on the factors affecting the achievement of secondary school students in mathematics based on the extent to which they are motivated. The results reveal that student's academic achievement in mathematics depends on the factors affecting their performance in mathematics. This finding corroborates that of [24] finding who stressed that successful students have significant higher motivation for achievement than unsuccessful students. Similarly, the report by [25] that academic achievement is highly correlated with student's

motivation lends a good support to the present findings, with reference to the position of [26], that when students express lack of interest in mathematics as a subject, it affects the way they react or listen to the teacher. It can be said therefore that interest and attitude of students towards mathematics as subject matters a lot. This is because these two constructs according to the researcher are highly motivating factor which can lead to better achievement on the part of the student. Good attitude and better interest students display particularly in mathematics serve as an encouragement even to the teacher. This can help the teacher a lot to disseminate his teaching to the best of his ability and knowledge making use of all available resources rather than resorting to the use of chalk and talk when students show no interest or negative attitude. Moreover, when the students display good attitude and better interest in mathematics, the teacher is motivated and this may cause him/her to forget whatever hindrances to the teaching of mathematics from him/her own part. Good impartation of mathematics knowledge on the part of the teacher couple with student's interest in the mathematics 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. The result of hypothesis three shows that there is no significance difference on suggested solutions to the problem of

poor academic achievement of secondary school students in mathematics. This findings reveals that adequate teaching aids, qualify teachers, teacher and students interaction in the classroom, well-equipped Mathematics laboratory and encouragement from parents are solutions to the problem of academic achievement in mathematics.

Educational Implication

The findings reported in this study justify the importance of motivation to academic achievement. The findings have implications for the teachers of mathematics that they should try as much as they could to motivate their students during the course of instructions. The parents as well as the government should engage in programmes that can motivate the students to improve their academic performance. It is therefore, hoped that these findings will serve as resource material for mathematics educators, government, and parents and significant others who are concerned with the academic progress of the students.

Limitation of the study

One major shortcoming of this study was that the researcher found it difficult to initially convince the students who were selected randomly from various schools as respondent towards understanding the essence of this investigation. The researcher established work and generated confidentiality which enhanced the objective completion of the copies of the researcher work.

RECOMMENDATIONS

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

- ✓ Mathematics teachers should try as much as possible to motivate their students during the course of instructions.
- ✓ Mathematics teachers should give award to the best mathematics students so that others students will be motivated to workhand.
- ✓ Mathematics teachers should make use of teaching aid in teaching of mathematics so that students can learn more effectively.
- ✓ A well-equipped mathematics laboratory should be provided for all secondary schools to enable students perform some of the mathematics practical which will motivate the students most.
- ✓ Mathematics teacher should interact with their students in the classroom so that they can be motivated to attend mathematics class regular.
- ✓ Parents should encourage their children to study their mathematics textbook and

notebook which will help them to perform very well.

- ✓ Government should employ a qualify teacher who specialize in mathematics.

CONCLUSION

The research was conducted to investigate the impact of motivation on secondary school student's achievement in mathematics. The results of this study showed that motivation have impact on

student's academic achievement in mathematics. Motivation enhance the learning of mathematics by students, students concentrate in the learning of mathematics as a result of motivation.

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