MOTIVATIONAL STRATEGIES FOR EFFECTIVE LEARNING OF MATHEMATICS AMONG SENIOR SECONDARY SCHOOL STUDENTS IN OBOLLO-AFOR EDUCATION ZONE OF ENUGU STATE.

BY

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Abstract

***T**he main purpose of the study was to investigate the Motivational strategies for effective learning of Mathematics among selected senior secondary school classes II students. The researcher adopted descriptive survey design to determine motivational strategies that can enhance secondary school students Mathematics learning. The population of the study consisted of all the senior secondary school classes II (SSS II) students, which is 3384 students in the 48 secondary schools in Obllo-Afor Education Zone of Enugu State. Three research questions and three null hypotheses guided the study. The hypotheses were tested at PÜ .05 level of significance. The instrument used for data collection was a researcher developed structured questionnaire of the four-point Likert type. The questionnaire instrument was face validated by experts in Measurement and Evaluation and Lecturers in Mathematics Education. The reliability coefficient of the instrument was obtained using test-retest method which yielded 0.87. Mean was used to answer the research questions while chi-square*

Introduction

Mathematics has been defined as science of magnitude and number that is virtually useful in all subject areas (Unodiaku, 2015). This is because all fields of studies are dependent on it for problem –solving and prediction of outcomes. Emphasis is laid on Mathematics because Mathematics is useful in almost all areas of human activities such as in trading and commercial activities, science and technology. It is also found useful or applicable in all aspects of ethno-mathematics, research and statistics. Really, the Mathematical knowledge will help Nigeria to produce citizens that can manufacture drugs, raw materials, machines and tools needed for our industries (Adetula, 2010). Moreso, Akinoso (2011) viewed Mathematics as the tool for achieving scientific and technological development. It may be in consideration of these and other uses of Mathematics that federal Government of Nigeria made it a core and compulsory subject at all the levels of 9-3-4 system of education in Nigeria as contained in the National Policy on Education (NPE, Rev. 2013) which still remains the rallying point for all educational objectives in Nigeria.

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Despite its great importance, it is the only subject that is most dreaded to learners among all subjects offered in schools (Onah, 2017). Students therefore tend to respond to it with less self-confidence, negative feeling and anxiety. This situation is worsened by the compulsory nature of the subject at both the primary and secondary schools levels, leading to students' poor performance in the subject. For instance, the West African Examination Council (WAEC) Chief Examiners' reports vindicated that in 2009, 2010 and 2011, showed downward trend in poor performance in Mathematics as 45.33%, 41.51% and 38.15% respectively were recorded in the three consecutive years. Unfortunately, students' performance in this all important subject (Mathematics) has been consistently poor especially in the Senior School Certificate Examination (SSSCE) organized by the West African Examination Council (WAEC) and the National Examination Council (NECO) (Anaduaku and Okafor, 2016; and Onah, 2017).

A situation such as the above reports where students are performing poorly consistently on the subject suggest that the students, society and Nigeria nation cannot gain the potentials of Mathematics and more importantly, cannot achieve success in science and technological breakthrough. This situation agrees with Unodiaku (2013) who observed that there has been sharp decline in the number of students that offer Mathematics and science-based disciplines at the tertiary level of education in Enugu State.

Literature search revealed various reasons suspected to be responsible for this dwindling and decline of students' interest in Mathematics as a school subject. Some of these reasons are also explored in this work. For instance, teachers' attitude, qualification and relationship with students have a significant impact on the students' attitude towards Mathematics (Onah, 2017). A qualified Mathematics teacher can easily use different approaches/methods, styles, illustrations, examples, and improvise materials in teaching students Mathematics concepts, principles or ideas which his counterpart (unqualified Mathematics teacher) cannot do (Unodiaku, 2015). The dismal performance of students in WAEC and NECO examinations in successive years was due to unqualified teachers in Mathematics teaching (Onah, 2017). Therefore, engaging qualified Mathematics teachers motivates the enthusiasm and playing games motivates students to learn Mathematics (Janelle, 2016). Praising your students often by way of recognizing their contributions and offering them rewards or incentives have been reported to be very effective in motivating students to learn Mathematics (Rossier, 2017; and Teach Thought Staff, 2017). Based on the above reports it is obvious that motivation is a factor of Mathematics learning that need to be strategized and integrated into the classroom for effective Mathematics instruction.

In Mathematics Education, much work have not been done on people's motivation to date (Evans and Wedege, 2004; Hannula, 2006; and Kjersti, 2017). Only a few researchers have distinguished between intrinsic and extrinsic motivation in mathematics (Goodchild, 2001; Holden, 2003; and Kjersti; 2017). Hannma (2016) pointed out that many of the above approaches failed to describe the quality of the individual's motivation for learning mathematics in sufficient detail. This study is aimed at describing the quality of individual's motivation for learning Mathematics in sufficient ways by determining the motivational strategy for effective learning of Mathematics among the selected senior Secondary School classes 11 students.

Motivation is the desire to succeed in achieving a goal which is meaningful to an individual or driving force that is activating behavior of an individual to do something (Hannula, 2016). According to Aydin and Costun (2011), if the students cannot learn well (Mathematics), one of the main reasons for this is that, they are not interested in the subject. One of the important task for the teacher is to provide motivation for the students such as possible classroom atmosphere established by the teacher. This will provide confidence in the students and phobia in learning Mathematics. As a result the students will develop positive attitude towards the subject, increase in motivation will emerge and may possibly increase desire to achieve better results. Aydin and Costun (2011) further said that to instill/inculcate the desired qualities in students and motivate them for lessons (such as Mathematics lessons) are possible, only by planning the process of teaching strategies. Strategies may be conceptualized to refer to specific actions taken by the learner to make leaning easier, faster, more enjoyable, more self-directed, effective and transferable to new situations. Dick (2001) defined strategy as a method generally used to cover the various aspects of sequencing and organizing the content, specifying learning activities and deciding how to deliver the content and activities. Effective learning is the ability of students to internalize information, make connections with prior knowledge and applying it to their present and future life situations. According to Venessa (2010), effective learning is students' gaining of knowledge that they can use throughout all aspects of their life and applying the knowledge and concepts they have learned. Katelyn (2010) opined that effective learning is a two–way street that requires motivation on the student's part as well as a dedicated teacher.

Statement of the problem

There are persistent dwindling interests of students in leaning mathematics as a subject of study among subjects offered in secondary school education level. This persistent dwindling interest of students in mathematics learning are reflected in the WASC and NECO Chief examiners' reports of 2009 to 2011 result, as well as individual reports. These persistent reports and continuous upward trend in good performance of students in mathematics has caused great concern to parents, students to learn the subject as well as brings close relationship between the teacher and his students. Moreso, this eliminates Mathematics anxiety and phobia among the students, since they can then learn the subject from a teacher with various teaching styles, good trained mind and competencies.

According to Spielgab (2016), if the students loose interest in studying Mathematics, the problem can show up as poor academic performance, lack of motivation or loss of interest in work. It is the duty of the teacher to provide the motivation for the students by creating conducive classroom environment so as to capture the confidence of the students. Consequent upon that the students will develop positive attitude towards the subject, be more motivated and consequently, desire to achieve better results. Onah (2017) opined that to instill or inculcate the desired qualities in the students and motivate them for Mathematics lessons and planning the process of the teaching strategies is required. Alfred (2013) added that in recent years, mathematics studies addressing the different dimensions of students' motivation have been made; for instance, the use of such strategies as: indicating the usefulness of a Mathematic topic, use of praise, rewards, team working, problem-solving, and handling of students' variations. Moreover, incorporating technology into lessons, enthusiasm and playing games motivates students to learn Mathematics (Janelle, 2016). Praising your students often by way of recognizing their contributions and offering them rewards or incentives have been reported to be very effective in motivating students to learn Mathematics (Rossier, 2017; and Teach Thought Staff, 2017). Based on the above reports it is obvious that motivation is a factor of Mathematics learning that need to be strategized and integrated into the classroom for effective Mathematics instruction.

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Motivation is the desire to succeed in achieving a goal which is meaningful to an individual or driving force that is activating behavior of an individual to do something (Hannula, 2016). According to Aydin and Costun (2011), if the students cannot learn well (Mathematics), one of the main reasons for this is that, they are not interested in the subject. One of the important task for the teacher is to provide motivation for the students such as possible classroom atmosphere established by the teacher. This will provide confidence in the students and phobia in learning Mathematics. As a result the students will develop positive attitude towards the subject, increase in motivation will emerge and may possibly increase desire to achieve better results. Aydin and Costun (2011) further said that to instill/inculcate the desired qualities in students and motivate them for lessons (such as Mathematics lessons) are possible, only by planning the process of teaching strategies. Strategies may be organized into three clusters each cluster addresses as specific factor. The three clusters are: Use of praise in motivating students to learn Mathematics; team-work in problem solving motivates students to learn Mathematics; and teacher understands of students' variables as a motivating factor for students to learn Mathematics. The instrument is composed of 15 items, each cluster has 5 items. The instrument was subjected to face validation processes and its reliability estimate was determined using test retest method which yielded reliability coefficient of 0.85.

The instrument was administered to the randomly sampled 216 students which provided data that were used for analysis. The data analysis was done using descriptive statistics and chi-square technique.

Results.

The results of the study were presented in the tables below.

Table 1: Mean (x) scores of students' responses on the extent the use of praise motivate students to learn mathematics.

S/n	Use of praise in motivating students to learn mathematics.	SA		A		D		SD		X		
		M	F	M	F	M	F	M	F	M	F	Remark
1	Praise given to me by the maths teacher											
	whenever I do well in maths ,	48	67	37		5	9			3.5		
	encourages me to achieve better result.			34				2		3.5		Agree
2	Teacher's insult on me for not doing	45	58					2				
	well in maths discourages me,			34						3.26		
3	I am motivated to do better in maths	51	46	46		9	8			3.45		
	whenever teacher praise my good											Agree
	performance.	47		38				6		3..49		
4	Teacher's lazier-fair attitude to maths	52		53				-		3.27		
	lessons discourage me from learning					5						
	maths.	4	-	39		10		-		3.39	3.36	Agree
5	I am d iscouraged from learning maths			48								
	by the teacher's regular use of							-		1 .65		
	punishment on me.			8				3		1.63		
				12		6						Agree
						12						
								2				
								-				Disagree
						33						
						45						
								49				
								54				

Result in table1 above showed that all the items have mean (x) score values between 3.26 and 3.5inclusive for both sexes except item 5 which has mean score values of 1.65 and 1.63 for males and females respectively. The mean values of items 1 to 4 are greater than the criterion mean of 2.5 which is the mean value of the four- point scale used for the study. This shows that the students agreed that praise can be used in motivating students to learn

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Term- work in problem – solving motivates students to lean mathematics.	SA	A	D	SD	X	Remark
Leaning maths in group motivates me.	115	68	23	-	3.45	Agree
I am motivated to learn mathematics whenever we are engaged in team-work in problem- solving.	108	84	10	4	3.44	Agree
I enjoy studying maths in small class size than in very large class size.	113	92	-	1	3.53	Agree
I am motivated to learn maths any time we are engaged in maths laboratory approach which encourages team-work in problem–solving.	109	78	17	2	3.42	Agree
I am not motivated studying maths with introverts.	1	9	71	125	1.45	Disagree

Result of table 2 showed those items 1 to 4 have mean (x) score values from 3.42 to 3.53. These mean values are greater than 2.5, the criterion mean. However, item 5 have mean value of 1.45, which is less than the criterion mean. This shows that all the students agreed that items 1 to 4 above indicated that team –work in problem – solving motivates students to learn mathematics. Moreover, the mean value of 1.45 on item5, which is below the criterion mean, shows that the students strongly disagreed that a learner studying mathematics with introverts does not motivate the learner.

	Handling of students’ variables as a motivating factor for students to learn mathematics						
S/N	ITEMS	SA	A	D	SD	Mean	Remark
1.	I am encouraged to learn Maths because of the teacher’s perception of individual psychological composition	107	83	14	2	3.43	Agree
2.	I am motivated to learn Maths because of the teacher’s friendly attitude to the students.	150	40	16	-	3.65	Agree
3.	Maths teachers are very autocratic, unfriendly and refused to embrace innovations in Maths teaching.	2 114	32	58		1.62	Disagree
4.	I hate learning Maths because teachers do not use Maths laboratory and games so as to make the lesson interesting, real and easy.	- 80	6	120		1.64	Disagree
5.	I hate Maths because my peer group friends hate the subject and always avoid attending the class.	148 1	53	4		3.69	Agree

Result of table 3 showed that the respondents accepted that items 1,2 and 5. All the items (1, 2 and 5) have mean scores above 2.5 criterion score. Items 3 and 4 have meant responses below 2.5 criterion score, which shows that the respondents disagreed on the teachers' understanding of students' variations of learning styles motivates students to learn Mathematics.

Table 4: chi-square (