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CONTENTS

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CONTENTS

Questioning Skill Sensitization and Teacher Self-Efficacy Training in Enhancing Students' Mathematics Achievement in Oyo State, Nigeria

FEHINTOLA, J.O.
Department of Counselling & Human Development Studies
University of Ibadan, Nigeria
jof677@yahoo.com, joseph.fehintola@gmail.com

Abstract
This study adopted the pretest-posttest control group quasi- experimental design with 3X2X3 factorial matrix. Multistage sampling technique was used to select 142 participants; representing senior secondary school II students who were selected from the three Senatorial zones in Oyo state, Nigeria. Participants were randomly assigned to two experimental groups and one control group. The mathematics achievement test (r = 0.982) was the research instruments used. Three null hypotheses were tested at α = 0.05 level of significance. Data were analysed using Analysis of Covariance (ANCOVA and Duncan post hoc test. There was a significant main effect of treatment on mathematics achievement ($F_{2, 123}$ = 80.971, p < 0.05). Questioning skill sensitization (QSS) group obtained the highest adjusted post – test mean score on mathematics achievement test (X = 51.79), followed by the Teacher self-efficacy training (TSET) (X = 49.03), while the least score was obtained by the control group (X = 35.23). There was significant main effect of gender on mathematics achievement test score ($F_{1, 123}$= 5.495; P <0.05). However, there was no significant main effect of the subjects' combination on mathematics achievement test ($F_{2,123}$ = 0.89; P > 0.05) among participants. QSS and TSET were effective in enhancing mathematics achievement. It is, consequently, recommended that conscious efforts should be made by counselling psychologists, mathematics teachers and other professionals working on student achievement to adopt these two methods during teaching-learning process. Taken into cognizance that gender and subjects combination as moderating variables improved the effectiveness of the intervention on mathematics achievement, and students are admonished to constantly practice mathematics exercise.

Keywords: Questioning sensitization skill, teacher self-efficacy training, Mathematics achievement test

Introduction

Over the years, senior secondary school education in Nigeria have been recording poor academic performance at an alarming rate either at the national, state and local government level. This shows that the aims and objectives of education are being defeated and it calls for an urgent intervention to rescue situation. Education is meant to be a process of facilitating learning and this goal will not be achieved without the positive or high outcome in academic performance through which the fulfilment of academic goals are usually measured. Previous research shows that one of the leading causes of low academic performance in the United States of America is poverty (Duncan & Mumane, 2011; Reardon, 2011). About 1 to 4 school age children and youths live in poverty which significantly impacts their ability to benefit from school and succeed educationally (Berliner, 2012; 2013). There are many negative effects of poverty for children to overcome. For instance, hunger can be detrimental to a child's ability to learn.

In the Nigeria of today, the effect of low academic performance is being manifested in all sectors. Year in, year out, the institutions produce unemployable graduates who end up adding up to the enormous problems the country already has at hand. For instance, lot of university graduates exist out there who lack good communication skills and the question that comes to the mind is, how did they graduate? To the graduates who are employed, there is doubt about their competence. Little wonder

wealthy Nigerians fly abroad to receive medical attention. A mechanical Engineering graduate cannot fix his own car when it breaks down and other examples show the extent to which the low or poor academic performance has affected the nation at large.

It was discovered that in 2002, in the NECO's maiden results, most candidates passed their registered subjects including English Language and Mathematics which led to the public accusing the examination body of awarding cheap results to students (Obioma & Salau, 2007). However, after 2007 NECO November/December examination where 65 per cent had credit passes in mathematics and 85 per cent credit passes in the English Language, performances of candidates have subsequently deteriorated every year, down to 11.3 per cent in 2011/2012 result, a situation which calls for concern among stakeholders.

In the June/July 2011 NECO SSCE school-based examination (Dibu-Ojerinde, 2011), less than 25 per cent of the 1,160,561 candidates had passes at credit level in subjects, including the two core subjects of Mathematics and English Language across the country. A statistical breakdown of the awful trends revealed that in June/July 2010 Secondary School Certificate Examination conducted by NECO, 79 per cent failed to get credit passes in English Language, while 24 per cent failed Mathematics. In the 2009 May/June Senior Secondary School Certificate (SSCE) examinations, only 12 per cent of candidates recorded the mandatory five credits in subjects including the compulsory Mathematics and English Language. Details of the result further showed that only 4,223 candidates out of the 234,682 candidates had five credits that include English and Mathematics, representing 1.8 percent of the total.

Furthermore, in the Nov/Dec 2009 NECO SSCE results, 98 per cent failed to clinch five credit passes, including Mathematics and English Language. What went wrong and why the examination body that was a toast of students before, suddenly go sour? Of the 1,503,931 candidates who sat for 2012 UTME, only three scored 300 and above compared to 2,892 that scored above 300 in the 2011 examination. Also, 72,243 scored 250 and above, while 336,330 scored below 170. The Registrar, Joint Admissions and Matriculations Board (JAMB), Dibu-Ojerinde, disclosed that 27,266 candidates in 52 of the 3,001 centres used for the examination had their results withheld by JAMB on account of malpractice.

According to the results released by the Head of the West African Examinations Council (WAEC) National office in Lagos (2014), only 529,425 candidates out of 1,692,435, representing 31.28 percent, obtained credits in five subjects and above including English Language and Mathematics, in the examination. This number consists of 929,075 male and 763,360 female candidates, who sat for the examination. A total of 1,605,613 candidates, representing 94.87 percent have their results fully released, while 86,822 candidates, representing 5.13 per cent have some of their subjects still being processed, due to what WAEC said were errors traceable to the candidates and their schools, either in the course of registration or writing the examination. The results of 145,795 candidates, or 9.61 percent of those who sat for the examination, are being withheld as a result of various types of examination malpractice. The candidates need credits in five subjects, including Mathematics and English Language, to gain admission into many of the tertiary institutions in the country.

The 2014 May/June result is a steep decline from those of the past two years. For instance, in the 2012 WASSCE result, 38.81 per cent of the candidates obtained credits in five subjects and above, including English Language and Mathematics. In 2013, the percentage declined to 36.57 percent, and fell further to 31.28 in the 2014 Senior School Certificate Examination. Statistics from WAEC also show that the declining performance also applies to the November/December WASSCE, in which woeful performances were also recorded in the last three years.

The extent of success in every examination situation is when the result gives a direction to the teaching, learning situation. A result oriented assessment for learning demands that after, the administration of a test instrument on students, feedback must be given and a detail analysis of the

students' performance. Questioning skill sensitization and Teacher self-efficacy training can be used as a basis for enhancing mathematics performance.

There are various methods used to increase class participation, however, the most important method is the use of effective questioning techniques. Structuring a classroom based on frequent participation is essential in assessing and enhancing each child's learning experience; without which the interaction between the teacher and the students, and education received can be greatly impeded. There are many classrooms in which it seems that the students lack motivation and interest in what the teacher is discussing. This is frequently because the teacher lacks the proper questioning skills to keep students actively engaged and interested in the contents being discussed. Never the less, there are several teachers who have mastered this concept and have received tremendous response from their students, thus, improving the overall learning environment and the teacher/student interaction. In trying to enhance mathematics achievement, it is important that the teacher understands how to use appropriate questions:- and observe the different response levels associated with various questioning techniques so as to allow teachers interact effectively students.

The questioning process is an essential part of instruction in that it allows teachers to monitor student thinking process and understanding as well as increase thought-provoking discussion. Frequently, a lesson is composed of many questions that often require minimal effort and low-level thinking to answer (Cooper, 2010). It is important to present students with questions that encourage reasoning and that allow them to draw from their prior knowledge rather than accepting "yes or no" responses. Through encouraging students to formulate educated responses and express their opinions, teachers are able to assess how familiar or interested students are in the content being discussed. Continuous involvement of students in their own learning experience and providing them with valuable feedback is a necessity in promoting progressive learning (Stiggins, 2008). Productive feedback, or follow-up, should serve to "clarify, synthesize, expand, modify, raise the level of, or evaluate students' responses" (Cruickshank, 2009). The importance of providing feedback is to encourage student-originated responses while correcting or elaborating on their effort. In the case of an incorrect response, it is appropriate to ask the students to provide support for their answer in an effort to guide them towards the correct solution (Cruickshank, 2009).

In addition to providing feedback, probing is another effective technique used to expand thinking and increase the likelihood of future response (Cruickshank, 2009). The premise behind probing is to direct the student's thinking towards the major concepts or important aspects of the topic. When using this technique, convergent questions, or those that encourage a single broad content answer, are most appropriate and help to obtain more elaborate responses (Cruickshank, 2009). In many classrooms, even when teachers pose divergent, high-level questions, students tend to show more comfort responding with convergent low-level answers.

Redirecting, or posing the same question to a different student, is another method that is often used with students who demonstrate high levels of self-confidence (Cruickshank, 2009). In contrast, students with a low self-concept respond poorly to this technique and are often discouraged by it (Cruickshank, 2009). Rephrasing is a different technique that can also have adverse effects; rather than rewording a question. It is better to obtain a response to serve as a basis then use probing to direct the attention of the student towards the correct answer (Cruickshank, 2009). When a teacher attempts to explain his question again, students may become confused or lose interest in participating. In accordance with these techniques, it is important to be aware of and appeal to student's current level of reasoning and competence as well as their particular interests. Rhetorical questions, or questions asked for effect instead of to generate responses, can also serve to confuse students and discourage future participation (Cruickshank, 2009). These questions tend to discourage continued participation

because students are often unsure if they are actually supposed to respond or if they are not. According to Vygotsky's socio-cultural theory, students perform at their best when they are working within their zone of proximal development (Berk, 2009). The zone of proximal development (ZPD) refers to a level of understanding in which a child is challenged but still able to comprehend and perform a particular skill. For example, teachers frequently ask questions pertaining to newly presented information in which the students are challenged to go beyond formulating simple responses and demonstrate higher-level thinking. When teachers present these types of questions, it is expected that they will follow-up and provide guidance through probing, allowing students to create their own responses with minimal assistance (Berk, 2009).

Another theorist, Howard Gardner, introduced the concept of multiple intelligences in which he states that each individual operates under the conditions of a certain intelligence such as linguistic or musical (Berk, 2009). Applying this theory to questioning techniques, it is beneficial to ask questions that incorporate as many of the intelligences as possible. This allow teachers to extend their lesson to a wider range of students and increase participation through individualizing questions; through this method students are able to make personal connections to their own interests and are encouraged to express their opinions (Berk, 2009). Benjamin Bloom's taxonomy is valuable when determining the types of questions that teachers should ask their students. Bloom stated that there are six different levels of thinking: knowledge, comprehension, application, analysis, synthesis, and evaluation (Cruickshank, 2009). In describing these six different levels of comprehension, also called the cognitive domain, Bloom stated that the first three were representative of low-order thinking, or content, whereas the last three were representative of high-level thinking, or process. Effective teachers appeal to each level of thinking to encourage students to draw conclusions, relationships, and applications of information they receive during class. Designing questions to match your objectives and the ability level of students is imperative in receiving strong responses and connecting major concepts of different lessons (Cruickshank, 2009). In order to do this however, planning questions prior to class discussion is necessary to ensure variety; divergent questions that appeal to a higher level of thinking are often more difficult to formulate, thus many teachers who do not plan in advance resort to asking predominately convergent questions (Cruickshank, 2009). The overemphasis on convergent questions lessens student interaction and hinders their ability to comprehend and retain information.

Teaching by its very nature involves solving ill-defined problems that are complex, dynamic, and non-linear. Consequently teacher effectiveness is largely dependent on personal ability, or how teachers define tasks, employ strategies, view the possibility of success, and ultimately solve the problems and challenges they face. It is this concept of personal agency—the capacity of teachers to be self organizing, self-reflective, self-regulating and proactive in their behaviour—that underlies the importance of self-efficacy as a critical component in teacher effectiveness. The link between personal agency and a teacher's efficacy beliefs lies in personal experience and a teacher's ability to reflect on that experience and make decisions about future courses of action. The construct of self-efficacy refers to an individual's belief in his or her capability "to organize and execute the course of action required to manage prospective situations" (Bandura, 1997). It is a task-specific belief that regulates choice, effort, and persistence in the face of obstacles and in concert with the emotional state of the individual. The task specific focus of self-efficacy distinguishes it from more global concepts such as self-esteem or confidence.

An individual's efficacy beliefs are built from diverse sources of information that can be conveyed vicariously through social evaluation as well as through direct experience (Bandura, 1986). Personal efficacy judgements have been found to have substantial predictive power for performance across a range of tasks and behaviours (Stajkovic & Luthans, 1998). In addition, self-efficacy beliefs are seen as important elements in many current views of motivation (Fehintola & Olofinyo, 2014).

They have also been found to mediate a number of individual variables relevant to teacher effectiveness such as job satisfaction, intention to quit the job, training and job adjustment in newcomers (Saks, 1995), and the connection between conscientiousness and ongoing learning (Fehintola & Falaye, 2011). These and other characteristics of self-efficacy beliefs suggest the construct holds considerable promise for the improvement of teacher development efforts.

Studies found that female students showed better progress than male students did (Fehintola & Falaye, 2011; Jansen, 1996; Shah & Burke, 1999; Vander Hulst & Jansen, 2002). Johnes (1990) observed that, an examination of attrition amongst males and females separately identified striking differences between the two groups in the characteristics associated with non-completion of their education. However, Johnes (1990) noted that, the effect of gender on the probability of non-graduation is uncertain. In a study on 'Inventory and Analytic overview of Africa Education sector Studies: Analyses, Agendas, and priorities for Education in Africa" by UNESCO: reviewing the education in Africa for the years 1990-1994, it was reported that higher rates of attrition were found among females than male students.

Statement of the Problem

The poor performances of students in both internal and external examinations most especially in WAEC and NECO examinations have become worrisome. Some educators are attributing it to teaching methodology that the teachers are using, most especially, many teachers are using lecture method where the students do not have chance to participate in the teaching-learning process and the teachers themselves do not ask questions from students talk less of given them chance to ask questions. Also, majority of the teachers kill the morale of the students by creating the fear in the mind of the learners that mathematics is difficult instead of telling or encouraging the students by telling that they can learn mathematics and that is not difficult in order to allay their fears. Instead they boost their fear that only few of them could understand mathematics and as a result of this, the students keep on failing it. Based on the above mentioned factors that is effects of lecture method and poor teachers encouragements of students of mathematics, the researcher investigate the effectiveness of questioning skill sensitization and teacher' self-efficacy training in enhancing mathematic achievement among the senior secondary school students.

Hypotheses

Hypothesis One: There is no significant main effect of treatment in enhancing students' achievement in mathematics.

Hypothesis Two: There is no significant main effect of subjects' combination in enhancing students' achievement in mathematics.

Hypothesis Three: There is no significant main effect of gender in enhancing students' achievement in mathematics.

Purpose of the Study

The purpose of the study is to experimentally investigate the effect of questioning skill sensitization and teacher self-efficacy training in enhancing mathematics achievement among senior secondary school students. In addition, the study will determine which of the treatment will be more effective in enhancing academic performance among participants. It also examines the extent to which the subjects' combination and gender affect the mathematics achievement of the students.

Significance of the Study

The study is significant and the findings would benefit every stakeholder in education. The beneficiaries include the teachers, school management, parents, and students, ministries of education, Educational researchers, non-governmental Organizations and general society at large in that the solution that will be provided in this work will help to enhance academic performance of the pupils, if it will be used in the course of teaching-learning process. It will help the teachers to improve better on his teaching method in order to enhance good performance from his students. It will be useful and helpful to the policy makers especially the curriculum developer, inspector of education, examiners by enabling the curriculum developer to know how to frame and design topics in a way that will also enable them to correct and improve the performance of the student by appraising the teaching methodology employed.

Methodology

Research Design: The study employed a pre-test, post-test, control quasi experimental design using a 3 x 2 x 3 factorial design. The participants of the study were divided into two experimental groups A_1, A_2, and one control group A_3. The male and female participants were constituted into two B_1 and B_2. Subject combinations were subsumed under gender into three C_1, C_2 and C_3. The diagrammatical representation is presented in Table 1. The first and second experimental groups were pre-tested and subjected to the instructional treatments (questioning skill sensitization and teacher self-efficacy training). The control group was equally pre-tested before they were exposed to a Conventional method of imparting knowledge. This served as placebo for the members of the group so as not to feel redundant in the programme. All the groups were post tested at the end of the sessions.

Table 1: A (3x2x3) factorial matrix for the enhancement of mathematics achievement

Gender X Subject Combination	Male B1			Female B2		
	Subject Combination			Subject Combination		
Treatments	Arts (C1)	Social Sci. (C2)	Science (C3)	Arts (C1)	Social Sci. (C2)	Science (C3)
Questioning Sensitisation Skill (A1)	13	5	10	7	5	7
Teacher Self-Efficacy Training A2	6	6	14	8	4	11
Control A3	4	9	9	3	5	16

This design is schematically represented as

O1 X A1 = O4

O2 X A2 = O5

O3 O6

Where O1, O2 and O3 are pre-test

O4, O5 and O6 are post-tests

XA1 = Experimental treatment of Questioning Sensitization Skill

XA2 = Experimental treatment of Teacher Self-efficacy Training

XA3 = Control group using conventional method

Population

The target population of the study consisted of all senior secondary school students in Oyo state, Nigeria.

Sampling Technique and sample

The sample size for this study is made up of one hundred and forty two (142) secondary school students randomly chosen from three local government areas in Oyo State. Multistage sampling technique was used to choose the sample. Multistage sampling technique which allows for the concurrent usage of other sampling methods such as simple random sampling technique and purposive sampling was used to select the participants in the study. At stage 1, simple random sampling was used to select three local government areas from the thirty-three local government areas in Oyo state. At stage II, simple random sampling technique was used to select 1 school each from each of the three LGAs. Furthermore, 142 students which formed participants used for the study was selected from the three secondary schools in Oyo State. Also, participants were assigned to the experimental groups (Questioning Skill Sensitization, Teacher Self-efficacy Training) and the control group. The distribution of the participants in this study is as shown Table 1 above. A total of 76 boys and 66 girls were used in the study.

Research Instrument

The Comprehensive Mathematic Achievement Test developed by the Researcher was adopted for this study. The Comprehensive Mathematic Achievement Test (CMAT) has a highly satisfactory internal consistency (reliability) coefficient of 0.72 and a satisfactory test-retest reliability coefficient of 0.782 over a six week interval. The CMAT has content validity because items of the test constitute clear descriptions of the many varied aspects of primary school mathematics.

Procedure

This study was carried out over a period of eight weeks among participants who willingly showed interests to participate in the training programme. Therefore, voluntary participation was solicited as only those participants who felt a need for such a programme came forward and participated meaningfully.

There were four phases of interaction with the participants: recruitment, pre-test, treatment period and post treatment evaluation. An appropriate place where the treatment was administered was secured. Moreover, three trained research assistants that assisted in administering and collecting the answer script were used. The researcher spent one hour thirty minutes each day, one day in the week when teaching sessions for each experimental group were held for the period of eight weeks.

The first experimental group (A_1) was treated using Questioning Sensitization Skill. This method involved imparting knowledge by asking as many questions of different types as much as possible for the purpose of knowing the areas of weaknesses of the participants. This group was subjected to eight lessons. The second experimental group (A_2) was subjected to Teacher Self-efficacy training which involved teaching the participants and inculcating in them the spirit of 'I can do it' and the teacher allowed them to do it on their own. This group was also exposed to eight lessons. The control group (A_3) was subjected to conventional method where the teacher teaches with usual/known method. This made the group not to feel total rejection.

Results

Hypothesis One: This hypothesis states that there is no significant main effect of treatment in enhancing students' mathematics achievement among participants.

To test this hypothesis, ANCOVA was adopted to analyze the post-test scores of participants in their performance in mathematics achievement test using the pre-test scores as covariates to ascertain if the post-experimental differences are statistically significant. The summaries of the analysis are presented in Table 1.

Table 1: Analysis of Covariance (ANCOVA) of Pre-post Test Interactive Effects of Mathematics Achievement Test Scores of Participants in the Treatment Groups, Subjects Combination and Gender

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9784.964[a]	18	543.609	14.135	0.000	0.674
Intercept	103.332	1	103.332	2.687	0.104	0.021
prescore	1613.406	1	1613.406	41.953	0.000	0.254
trtgrp	6227.900	2	3113.950	80.971	0.000	0.568
gender	211.305	1	211.305	5.495	0.021	0.043
Subjcombination	68.305	2	34.153	.888	0.414	0.014
trtgrp * gender	409.404	2	204.702	5.323	0.006	0.080
trtgrp * Subjcomb.	23.551	4	5.888	0.153	0.961	0.005
gender * Subjcomb.	150.691	2	75.345	1.959	0.145	0.031
trtgrp * gender * Subjcomb	116.959	4	29.240	0.760	0.553	0.024
Error	4730.275	123	38.458			
Total	97560.000	142				
Corrected Total	14515.239	141				

a. R Squared = 0.674 (Adjusted R Squared = 0.626)

The results presented in Table 1 shows that there is significant main effect of treatments on mathematics achievement test ($F_{(2,123)}$= 80.971, $p<0.05$, $\tilde{\eta}$ =0.568). Premised on this, the null hypothesis is rejected. It is therefore concluded that there is significant main effect of treatment in mathematics achievement test among the participants. To further provide information on mathematics achievement test among the three groups (Teacher self-efficacy training, questioning skill sensitization, and Control) the multiple classification analysis (MCA) is computed and the result is shown in Table 2.

Table 4.2: Post-Hoc Multiple Classification Analysis

Variable + Category	N	Unadjusted		Adjusted for Independents + Covariates	
		Dev'n	Eta	Dev'n	Beta
TRTGRP					
Questioning skill sensitiz	47	16.56		16.31	
Teacher Self-efficacy	49	15.80		15.37	
Control	46	+0.00		0.01	
			0.67		0.60
Subjects Combination					
1. Science subjects	41	11.29		11.81	
2. Arts subjects	34	09.67		09.67	
3. Social science subjects	67	11.40		11.40	
			0.15		0.16
GENDER					
1. Male	76	12.15		-12.13	
2. Female	66	09.42		-09.12	
			0.18		0.13
Multiple R Squared					0.674
Multiple R					0.626

Grand Mean = 35.23

From the MCA Table, it is evident that the Questioning skill sensitization (QSS) group had the highest adjusted post test mean score ($\bar{x}$ =51.79) followed by Teacher self-efficacy training (TST) group with adjusted post-test mean score ($\bar{x}$ =49.03) while the control group had the lowest adjusted mean score ($\bar{x}$ = 35.23). These values are obtained by summing the grand mean to the respective adjusted deviations, QSS ($\bar{x}$ =35.23 + 16.56 = 51.79), TST ($\bar{x}$ =35.23 + 13.80 = 49.03) and control ($\bar{x}$ = 35.23 + 0.0 = 35.23). The direction of the increasing effect of the interactions on the mathematics achievement test are QSS> TST>control. Table2 indicates that the independent variables jointly accounted for as much 67.4 per cent (MR^2=0.674) of the variance in the mathematics achievement test among the participants while the remaining 32.6 per cent is due to pre-test measures or other unexpected sampling errors.

To further test the source of the significant effect of the treatments on participants' mathematics achievement test, the Scheffe post hoc test was carried out. The summary of the results is presented in Table 3.

Table 3: Scheffe Post hoc test on Students' Mathematics Achievement Test

Treatment group	N	Subset for alpha = 0.05	
		1	2
Questioning Sensitization Skill	47	51.79	
Teacher Self-efficacy Training	49	49.03	
Control	46		35.23
Sig.		.104	1.000

From Table 3, all the three possible pairs are significantly different at < .05. Specifically, there is a significant difference between pairs of:
(i) QSS and Control (ii) TSET and control (iii) QSS = TSET.

Therefore, the two pairs contributed to the significant effect observed for treatment on students' mathematics achievement test.

Hypothesis Two: This hypothesis states that there is no significant main effect of subjects' combination in mathematics achievement test of secondary school students. The result of the analysis is as presented in Table1 which indicates that there is no significant main effect in the mathematics achievement post-test scores of science combination, arts combination and social science combination of participants exposed to treatment (QSS, TST and the control group) ($F_{(2,123)}$=0.89, p>0.05, $\tilde{\eta}$ =0.009). The null hypothesis of there is no statistically significant main effect of subjects' combination on secondary school students is supported; hence the hypothesis is hereby accepted. This affirms that there is no significant main effect of subjects' combination in mathematics achievement scores among the participants.

Hypothesis Three: This hypothesis states that there is no significant main effect of gender on mathematics achievement test scores of the secondary school children. The result of the analysis as presented in Table 1 indicates that there is significant main effect of gender on the mathematics achievement test post-test scores of male and female participants exposed to treatments (QSS and TST) and the control group ($F_{(1,123)}$=5.495, p<0.05, $\tilde{\eta}$ =0.024). Thus, null hypothesis is rejected. It is therefore concluded that there is significant main effect of gender on the SS2 students' mathematics achievement test score.

To further provide information on the mathematics achievement test among the two levels (male and female) the MCA was computed and the result presented in Table2. From Table2, it is evident that the males had high adjusted post-test mean score ($\bar{x}$ =23.08) while the females had adjusted mean score ($\bar{x}$ = 25.81). These values were obtained by summing the grand mean to the respective adjusted deviations Male ($\bar{x}$ =35.23 + 12.15 = 47.38) and female ($\bar{x}$ =35.23 + 9.42 = 44.65). The direction of the increasing effect of the interactions on the mathematics achievement test score are male > female.

Discussion

Findings in this study have clearly shown that QSS and TSET have significantly influenced students' achievement in mathematics, and that QSS is more potent in enhancing mathematics achievement than TSET. The results which showed that there was significant main effect of treatment, is in agreement with Marback-Ad and Sokolove (2000) who reported that encouraging and emphasizing question-asking better exposes students to the fundamental basic principle of mathematics. Students who ask questions retain material better than those who do not. The finding also is in line with findings of Home (2001) who discovered that questions both teachers and students questions play important role in every classroom. Teachers can create an active learning environment by encouraging students to ask and answer questions.

The result of the hypothesis which states that there is no significant main effect of gender on mathematics achievement among secondary school students was rejected. This finding corroborated some past studies that found that there was significant difference between sex, and academic performance of university freshmen (Fehintola & Falaye, 2011). This finding indicates that if the teachers use appropriate method of teaching like QSS and TSET appropriately, and if they are given courage like you can do it and the opportunity to explore their-environment there is no doubt that these boys and girls will compete favourably within themselves and their counterparts elsewhere when comes to issue of knowledge acquisition. Also, this finding is in line with the work of researchers like

(Fehintola & Falaye, 2011) who found gender as a determining factor in doing well on a particular task.

The third hypothesis was accepted, indicating that there is no significant main effect of subject combination in mathematics achievement among participants. This finding indicates that regardless of subject combination a student chooses to study if the teacher uses the QSS or TSET methods the students will acquire adequate knowledge that will make individuals excel in mathematics. This finding is contrary to the findings of Hulst and Janean (2002) who discovered that, that subject combination is an indicator of mathematics ability, and that science subjects combination individuals perform best followed by social science subject combination and finally followed by arts subject combination individuals.

Conclusion

Based on the findings of this study the researcher therefore concluded that the mathematics teachers should teach their students with questioning skill sensitization method and teacher self-efficacy training for better mathematics achievement and to be able to compete favourably with their counterparts elsewhere when comes to issue of competition. The teachers' roles in the mathematics classroom should be to guide, facilitate, and collaborate, to be role model, motivate, and to help students to develop the skills in them.

The following recommendations are also derived from the study, namely: that conscious effort should be made by education stake holders working on educational issues to encourage teachers to adopt the two instructional methods during teaching-learning process to enhance mathematics achievement among senior secondary school students and to proffer solution to problems associated with academic performance challenges. Teachers should employ methods that will give the children the opportunity to explore their-environment. Teachers should de-emphasize conventional method and concentrate on methods that will involve active participation by the children. Teachers should employ questioning skill sensitization and teacher self-efficacy training when teaching so as to help these young children to learn very fast and to give the students the opportunity to explore their-environment.

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