Improving Science Students' Performance and Interest in Mathematics: What will be the Effect of Brainstorming Instructional Strategy secondary schools in Makurdi Metropolis?

[1]Sharon Mnena Abaver,
[2]Felix Sesugh Kpiranyam
&
[3]Jackson Ochigbudu Ode
[1, 2 & 3] Department of Science and Mathematics Education,
Benue State University, Makurdi,
Nigeria.

Abstract
This paper investigated the impact of brainstorming instructional strategy on science students' performance and interest in mathematics within secondary schools in Makurdi Metropolis. Two research questions and two hypotheses were formulated to guide the study. Quasi-experimental pretest-posttest non-randomized design was used for the study. The population consisted of 10,290 Senior Secondary (SS) II students out of which 212 students offering science were randomly drawn. Mathematics Performance Test (MPT) and Mathematics Interest Inventory (MII) developed by the researchers were used to collect data. The MPT and MII were validated by two experts in mathematics education and one in measurement and evaluation with their comments incorporated to improve the instruments. The reliability coefficient of MII was computed using Cronbach alpha while that of MPT computed using Kuder-Richardson formula 20 were 0.79 and 0.86 respectively. Pre-test was done by research assistants at the first week before treatment for four weeks and post-test on the sixth week. Brainstorming instructional strategy lesson plans on Algebra were used for treatment by trained research assistants. The research questions were answered using means and standard deviations while Analysis of Covariance (ANCOVA) was employed to test the hypotheses at 0.05 significant level. The result showed significant difference between the mean academic performance scores ($p = 0.000 < 0.05$) of science students' taught mathematics using brainstorming instructional strategy and conventional method in mathematics. Finding also indicated significant difference between the mean interest ratings of science students' taught mathematics using brainstorming instructional strategy and the conventional method in mathematics ($p = 0.000 < 0.05$). The study recommended that teacher training institutions should ensure adequate training of mathematics teachers on the use of brainstorming instructional strategy for classroom instruction.

Key words: Brainstorming instructional strategy, science, mathematics, performance and interest

Introduction

Mathematics is integral to everything humans do. Mathematics knowledge plays a significant role in the lives of individuals towards the development of any society (Odumosu, 2010). Several occupations which science students may choose to pursue and much of their everyday lives are full of opportunity and the need to apply mathematics. Mathematics has been described as a model of thinking which encourages learners to observe, reflect and reason

logically about a problem and in communicating ideas, making it the central intellectual discipline and a vital tool in science, commerce and technology (Imoko & Agwagh, 2006).

Akinmola (2014) noted that mathematics is a tool and a language for solving problem people face on a day to day bases. Adequate Mathematics knowledge could help science students become more innovative, develop high interest in mathematics, and apply sound reasoning and decision-making ability. In terms of curriculum relevance, mathematics is compulsory for science students at the upper basic, senior secondary school level and a course offered at the tertiary level of education. Furthermore, a credit pass in mathematics is a necessary requirement for admission to study most science and technology courses, as required by the joint admission and matriculation board (JAMB). However, science students' performance in mathematics in Nigeria has been reported to be unsatisfactory (WAEC, 2014, 2015, 2018, 2019), despite the importance of the subject to science students in particular and humanity in general (Aligba & Garba, 2020). This has become a concerns among science education stakeholders. There is the possibility that science students' poor performance in Mathematics may be tied to the strategies adopted by mathematics teachers in Nigerian schools. Research evidence indicate that some mathematics teachers use defective strategies in the teaching and learning of mathematics (Filgona, Sababa & Iyasco, 2016). The conventional strategy with the mathematics teacher dominating proceedings and students acting as recipients of information is still common in some senior secondary schools. Such a strategy may fail to facilitate high performance as students are not adequately involved in the teaching and learning processes.

Educators have advocated for a paradigm shift from conventional talk and chalk strategy of teaching to innovative strategies that engage students in the teaching and learning processes (Samba & Kpiranyam, 2021) to promote effective learning of students in the 21st century for national and global economic growth and development. An option in tackling the challenge of low performance and interest of science students could be the use of brainstorming instructional strategy. Unin and Bearing (2016) stated that brainstorming strategy is an open sharing activity, which is conducted in small groups to encourage active participation. This innovative strategy involves students in groups contributing ideas spontaneously and proffering solutions to problems to enhance their understanding. This strategy may improves understanding because team members bring out their ideas, discuss them and this helps each other learn better.

Abdulazeez, Tanko and Otuyo (2017) stated that brainstorming learning strategy elicits higher levels of reflective thinking and creative problem solving, including synthesis, application and evaluation. Students' interaction is an important part of developing the cognitive skills involved in generating ideas. The environment free of criticism provided in a brainstorming classroom setting allows for creative and unrestricted exploration of options or solutions. Students thus, think carefully about the question, make new connections and enlarge the limits of their knowledge and skills which could improve students' performance and

interest. As the name suggests, brainstorming helps stimulate or excite the brain into thinking about issues in a new way. Abdulazeez, Tanko and Otuyo (2017) opined that brainstorming strategy encourages students to embrace spontaneity, originality and imagination. In this study, brainstorming is an instructional strategy where students are put into small groups to indulge in free thinking, sharing of ideas and interaction between students-students and between students and their teacher. This may help science students develop interest in learning Mathematics.

Research indicate the effects of brainstorming instructional strategy in enhancing students' performance in science (Wagbara, 2020). This suggest that brainstorming instructional strategy could help improve the performance of science students and also enhance their interest in Mathematics.

Interest, a personality trait, is described by Agogo, Odoh and Ben (2014) as the feeling that prompts students to spontaneous activity. This implies that, science students are likely to pay attention to learn mathematics, remember, imagine and read more readily when their interest is positively stirred. Interest according to Kalu, Achor and Otor (2021) acts as a force that drives students to desire and meaningfully learn. As such, if students fail to show interest in the subject, they may not learn maximally during the teaching and learning processes. Evidence abound in literature that students vary in the interest they show during learning activity (Olaf, Jurgen & Kai, 2010).

Researcher reports indicated that teachers can improve students' interest by utilizing innovative approaches during teaching (Agogo, Odoh & Ben, 2014; Udabah & Nneji, 2019). Onyishi (2009) found that Mind Maps strategy was effective in enhancing students' interest and achievement in measures of central tendency in Mathematics in Nsukka. Furthermore, Udabah and Nneji (2019) stated that brainstorming problem solving techniques exhibited higher interest in mathematics in Enugu State. Wagbara (2020) found effectiveness of brainstorming strategy on students' achievement in Chemistry in Rivers State, Nigeria. Other studies like, Filgona, Filgona, Sababa and Ndatuwong (2016) and Atsuwe and Musa (2021) in physics in social studies reported on the effects of brainstorming. Brainstorming strategy may also be more effective on less successful students due to the fact that students share ideas as they brainstorm together as such could learn from each other. However, literature is scarce in the study area on the effectiveness of brainstorming strategy in fostering interest and performance of science students in Mathematics. Thus, it is costly to assume that the results obtained for this strategy in other subjects and among other group of students could apply to science students offering Mathematics in Makurdi without investigating it. This study therefore, seeks to find out the effect of brainstorming instructional strategy on science students' performance and interest in mathematics.

Purpose of the Study

The purpose of the study is to evaluate facilitative effects of brainstorming instructional strategy on science students' performance and interest in mathematics. The following specific objectives guided the study:

1. To determine the academic performance scores of science students taught mathematics using brainstorming instructional strategy and those taught using the conventional strategy.
2. To determine the interest ratings of science students taught mathematics using brainstorming instructional strategy and those taught using the conventional strategy.

Research questions

The following research questions were raised guide the study:

1. What is the difference between the mean academic performance scores of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics?
2. What is the difference between the mean interest ratings of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics?

Null Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference between the mean academic performance scores of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics.
2. There is no significant difference between the mean interest ratings of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics.

Methodology

This study was a quasi-experimental study of a non-equivalent pre-test post-test control group design. The design was adopted because it was not possible to have complete randomization of subjects as in true experiments. Hence, intact classes were used for the study. The sample size consisted of 212 students offering science drawn using multistage sampling from a population of 10,290 SS II science students in Makurdi Metropolis in Benue State. Four intact classes from four schools were used for the study, two were assigned to experimental while the other two were assigned to control groups. Data were collected using two instruments: Mathematics Performance Test (MPT) and Mathematics Interest Inventory (MII) developed by the researchers. The MPT consisted of 40-item multiple choice objectives test questions developed based on SS II mathematics curriculum in Algebra topics. The questions had four options lettered A to D. Each correct answer attracted 1 mark using the marking guide. Mathematics interest Inventory (MII) had 30 items developed based on a four – point Likert

like scale with response options: Strongly Agree (SA) 4 points, Agree (A) 3 points, Disagree (D) 2 points and Strongly Disagree (SD) 1 point. There were both positive and negative items on MII. The negative items were scored in reverse order. The MPT and MII were validated by two experts in mathematics education and one in measurement and evaluation all from Benue State University, Makurdi. Their expertise was sought in terms of scope, clarity, suitability, and their comments were incorporated to modify and improve the instruments. The MPT and MII were trial tested on a sample of 40 science students in SS II who were part of the population but not part of the sample. The reliability coefficient of MII was computed using Cronbach alpha while that of MPT was computed using Kuder-Richardson – 20 and were found to be 0.79 and 0.86 respectively. These values show that the instruments are reliable as Emaikwu (2015) approved any instrument with reliability value ranging from 0.7 - 0.99.

The study lasted for a period of six weeks. The researcher organized a training programme for the teachers who were used in the study. The MPT and MII were also administered as pre-test by the research assistants at the first week before treatment began. Intact classes were assigned to experimental and control groups. The experimental groups were taught mathematics using brainstorming instructional strategy by Graduate teachers who specialize in mathematics education with at least three years' experience while the control groups were taught mathematics using the conventional strategy All the teachers have similar characteristics. Treatment began on the second week and lasted for four weeks. During the 6th week, MPT and MII were administered as post-test by the research assistants. Items on the MPT were however reshuffled before post-test. The research questions were answered using means and standard deviations while Analysis of Covariance (ANCOVA) was employed to test the hypotheses at 0.05 significant level.

Result

Results are presented in line with research questions and hypotheses.

Research Question 1: What is the difference between the mean academic performance scores of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics?

Table 1: Mean and Standard Deviation of Performance scores of Science Students' Taught Using Brainstorming Instructional and Conventional Strategy in Mathematics

Instructional Strategy		Pre-MPT	Post-MPT	Mean Gain
Brainstorming Instructional Strategy	Mean	16.27	29.38	13.11
	Std. Deviation	6.75	4.39	
	N	98	98	
Conventional Strategy	Mean	15.46	22.24	6.78
	Std. Deviation	6.44	6.99	
	N	114	114	
Mean Difference				6.33

Result in Table 1 reveals that students taught using brainstorming instructional strategy have a mean performance scores of 16.27 with standard deviation 6.75 in the Pre-MPT and mean performance scores of 29.38 and standard deviation of 4.39 in the Post-MPT. Students taught using conventional strategy have a mean performance scores of 15.46 and 22.24 in the Pre-MPT and Post-MPT with standard deviation of 6.44 and 6.99 respectively. The mean gain of 13.11 for students taught using brainstorming instructional strategy is higher than that of 6.78 for conventional strategy thus suggesting they gained more than their counterparts by the mean gain difference of 6.33. By implication, brainstorming instructional strategy facilitated understanding and performance among science students in mathematics more compared to the conventional strategy.

Research Question 2: What is the difference between the mean interest ratings of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics?

Table 2: Mean and Standard Deviation of Interest ratings of Science Students' Taught Using Brainstorming Instructional and Conventional Strategy in Mathematics

Instructional Strategy		Pre-MII	Post-MII	Mean Gain
Brainstorming Instructional Strategy	Mean	2.41	3.11	0.70
	Std. Deviation	0.38	0.37	
	N	98	98	
Conventional Strategy	Mean	2.35	2.94	0.59
	Std. Deviation	0.43	0.29	
	N	114	114	
Mean Difference				0.11

Result in Table 2 indicates that students taught using brainstorming instructional strategy have a mean interest rating of 2.41 and 3.11 with standard deviation 0.38 and 0.37 in the Pre-MII and Post-MII respectively. The table further reveals that students taught using conventional strategy have a mean interest rating of 2.35 and 2.94 in the Pre-MII and Post-MII with corresponding standard deviation of 0.43 and 0.29 respectively. Students taught using brainstorming instructional strategy have a mean gain of 0.70 while their counterparts taught using conventional strategy have 0.59 with a mean gain difference of 0.11 in favour of students taught using brainstorming instructional strategy. This implies that brainstorming instructional strategy enhanced interest among science students in mathematics more compared to the conventional strategy.

Null Hypothesis 1: There is no significant difference between the mean academic performance scores of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics.

Table 3: One-Way ANCOVA Test of Students' Mean Performance Scores in Brainstorming and Conventional Instructional Strategies

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2706.014[a]	2	1353.007	38.313	.000	.268
Intercept	20955.608	1	20955.608	593.403	.000	.740
Pretest	18.952	1	18.952	.537	.465	.003
Group	2704.749	1	2704.749	76.591	.000	.268
Error	7380.684	209	35.314			
Total	148348.000	212				
Corrected Total	10086.698	211				

a. R Squared = .268 (Adjusted R Squared = .261)

Results in Table 3 indicates that F(1,209) = 76.591, p = 0.000 < 0.05. Thus, the null hypothesis is rejected. The interpretation is that, there is significant difference between the mean academic performance scores of science students' taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics. Therefore, brainstorming instructional strategy proved to be more effective in enhancing performance of science students in mathematics than the conventional strategy. The effect size (partial eta squared = .268) means that only 26.8% of the difference in the mean scores is attributed to the strategy used indicating a small effect size.

Null Hypothesis 2: There is no significant difference between the mean interest ratings of science students taught using brainstorming instructional strategy and those taught using the conventional method in mathematics.

Table 4: One-Way ANCOVA Test of Students' Mean Interest Ratings in Brainstorming and Conventional Instructional Strategies

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.396[a]	2	.698	6.387	.002	.058
Intercept	54.960	1	54.960	503.042	.000	.706
Pre-MII	.006	1	.006	.051	.821	.000
Group	1.395	1	1.395	12.772	.000	.058
Error	22.834	209	.109			
Total	1957.513	212				
Corrected Total	24.230	211				

a. R Squared = .058 (Adjusted R Squared = .049)

The result in Table 4 shows F (1,209) = 12.772, p = .000 < 0.05. Thus the null hypothesis is rejected. By implication, there is significant difference between the mean interest ratings of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics. Therefore, brainstorming instructional strategy proved to be more effective in enhancing interest in mathematics than the conventional

strategy. The Partial Eta Squared value of 0.058 signifies that only 5.8% of the difference in the students' interest ratings can be attributed to the use of strategy indicating a very small statistical effect size.

Discussion of Findings

The study examined the effects of brainstorming as an instructional strategy on some Nigerian secondary school science students' performance and interest in mathematics. The findings revealed that there is significant difference between the mean academic performance scores of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics. This finding corroborates that of Wagbara (2020) significant difference between performance of students taught using brainstorming strategy and lecture strategy. The finding of this study is also consistent with that of Filgona, Filgona, Sababa and Ndatuwong (2016) and Atsuwe and Musa (2021) which reported statistically significant difference in the mean scores of students taught using brainstorming and conventional strategy. The likely justification to the similarity of these findings may be connected to the fact that brainstorming instructional strategy helps the students in a group become active in as they learn share ideas and this prompts their creative thinking processes making them able to understand the concepts they learn better and cope with complex and difficult problems. Brainstorming instructional strategy may also captivate students' attention thus help them become curious which could lead to better learning and more interaction which could have led to better performance of the students in mathematics when compared to the conventional strategy.

The finding also indicated that there is significant difference between the mean interest ratings of science students taught using brainstorming instructional strategy and those taught using the conventional strategy in mathematics. This result is consistent with previous reports by Udabah and Nneji (2019) that students taught mathematics with brainstorming strategy exhibited higher interest in mathematics than those taught with lecture method. Abdulazeez, Tanko and Otuyo (2017) found that brainstorming instructional strategy improves students' active participation in the classroom as they interact with one another and the teacher. Perhaps, the fact that brainstorming instructional strategy encourages science students to be actively involved in the classroom activities stimulates their interest more compared to when they are taught mathematics using conventional strategy. Thus, Onoja and Toryem (2018) stated that students should be engage in activities that will further boost their desire and enhance their interest in learning. This result is contradictory to the report by Triansa, Zendrato and Appulembang (2016) which found no significant difference in students' interest in engagement between the group taught with brainstorming in mathematics and that which was taught without brainstorming. The lack of consistency between the two studies could be due to variance in activities adopted during the studies or due to method of sampling or variation in location of the studies. These findings show that if an instructional strategy like brainstorming which

encourages students to interact, stimulate their interest and is student-oriented, it will most likely foster academic performance and interest in mathematics as found in this study.

Conclusion

Based on the findings, it is concluded that science students taught mathematics with brainstorming instructional strategy exhibited significant difference in their performance in mathematics as compared to those taught using the conventional method. The study also showed that science students taught mathematics with brainstorming instructional strategy show significant difference in their interest in mathematics compared to those taught using the conventional method.

Recommendations

The following recommendations were made:

1. Mathematics teachers should incorporate brainstorming instructional strategy in lesson delivery in order to foster science students' ability in learning and understanding mathematics to improve performance and interest.
2. Teacher training institutions should ensure adequate training of mathematics teachers on the use of brainstorming instructional strategy for classroom instruction to improve science students' performance and interest.

References

Abdulazeez, N. L., Tanko, K., & Otuyo, B. (2017). Effect of brainstorming as an instructional strategy on students' attitude to mathematics. *Capital Journal of Education Studies, 5*(1), 067 – 078.

Agogo, P.O., Odoh, C., & Ben, S. (2014). Interest and sustenance as correlates of students' performance in senior secondary chemistry in Ogbadibo Local Government Area of Benue State, Nigeria. *Global Educational Research Journal, 2*(5), 055-60.

Akinmola, A.E.A. (2014). Developing mathematical problem solving ability: A panace foe a sustainable development in the 21st century. *International Journal of Education and Research, 2*(2), 1-8.

Aligba, S.O., & Gani, G. A. (2020). Comparative analysis of students' performance in mathematics at national examination council (NECO) between public and private schools in Taraba state from 2006-2015. *BSU Journal of Science, Mathematics and Computer Education, 1*(2),

Al-Maghawry, A. (2012). Effectiveness of using the brainstorming technique to learn some basic skills and collection of knowledge for beginners in volleyball. *World Journal of Sport Sciences,* 6 (4), 361-366.

Anakpua, B. C., & Okoli, O. B. (2012). The impact of mathematics instruction on students' interest in teaching and mearning of Mathematics at the secondary school level, *Journal of*

Research in Education Vol. 1 No. 1 June 2012. Retrieved from https://oasisresearchjournals.com Retrieved on 14th February 2022.

Atsuwe, B.A., & Musa, T. D. (2021). The effect of brainstorming on students' academic achievement in physics in senior secondary schools of Makurdi Local Government Area of Benue State, Nigeria. *International Journal of Advance Research and Innovative Ideas in Education, 7(*2), 183-192.

Bichi, S.S. (2001). *Effects of problem solving strategy and enriched curriculum on secondary school students' achievement in evolution concepts* (Unpublished doctoral dissertation). Ahmadu Bello University, Zaria Nigeria. FCT College of Education Zuba Abuja. Retrieved from. www.fctcoezuba.edu.ng. 23rd February 2022.

Dankang, P.D., Achor, E. E., & Otor, E.E. (2021). Enhancimg students' science process skills acquisition in Physics through the use of interactive students' notebook with feedback strategy. *BSU Journal of Science, Mathematics and Computer Education, 2*(1), 59-70.

Emaikwu, S. O. (2015). *Fundamentals of research method and statistics.* Makurdi: Selfers Academic Press Limited.

Filgona, F., Sababa, L.K., & Iyasco, M.D. (2016). Effect of brainstorming learning strategy on junior secondary school students' academic achievement in socials studies in Yola educational zone, Adamawa State, Nigeria. *International Journals of Sciences and High Technologies,* 3(2)108-115

Filgona, J., Filgona, J., Sababa, L.K., & Ndatuwong, L.G. (2016). Effects of concept mapping and brainstorming instructional strategies on junior secondary school students' achievement in social studies in Mubi Educational Zone, Nigeria. *British Journal of Education, Society & Behavioural Science, 18*(2), 1-18.

Imoko, I. B., & Agwagha, U.N. (2006). Improving students' interest in mathematics through concept mapping technique: A focus on gender. *Journal of Curriculum and Teaching, 1*(1), 30-36.

Kalu, R.U., Achor, E.E., & Otor, E.E. (2021). Use of assertive questioning and prior knowledge of behavioural objectives strategies to enhance interest of students of different ability groups in chemistry. *BSU Journal of Science, Mathematics and Computer Education, 2*(1), 34-49.

Odumosu, M.O. (2010). Effects of two learning strategies OF pupils' problem solving skills in mathematics for sustainable development. Conference proceeding of school science. 219-224.

Olef, K., Jurgen, B., & Kai, S. (2010). Does interest matter? The relationship between academic interest and achievement in mathematics. *Journal of research in Mathematics Education, 32*(5), 448-470.

Olunloye, O. (2010, February 7) Mass failure in mathematics: A national disaster. Tribune. Retrieved from *http://www.tribune.com.ng.* 22nd February 2022.

Onoja, A.B., & Toryem, M.M. (2018). Comparative analysis of scientific literacy of private and public school students at upper basic level of education in Katsina-Ala LGA. *Journal of Curriculum and Teaching, 10*(2), 38-46.

Onyishi, E. U. (2009). Effect of mind maps on students' interest and achievement in measures of central tendency in mathematics. Unpublished M.ED Dissertation in Mathematics Education to the Department Of Science Education University of Nigeria, Nsukka.

Samba, R.M.O., & Kpiranyam, F.S. (2021). Effects of assertive questioning strategy on students' critical thinking and performance in Biology in Vandeikya of Benue State, Nigeria. *Education Review Letters, 6*(6). Retrieved on 23rd February 2022 from www.mindsourcingoa.com

Triansa, E. A., Zendrato, J., & Appulembang, O. D. (2016). The effect of brainstorming implementation on students' engagement in learning about probability in math classes XI IPA at SMA ABC Cikarang. *A Journal of Language, Literature, Culture and Education, 12*(1), 20-30.

Udabah, C. U., & Nneji, S. O. (2019). Effect of brainstorming problem solving technique on junior secondary school students' interest in Mathematics in Agbani Education Zone of Enugu State. *Sapientia Global Journal of Arts, Humanities and Development Studies, 2*(2), 144 – 150.

Uhumuavbi, P.O., & Umoru, G.E. (2005). Relationship between interest in Mathematics and science among Polytechnic students - A case study of Auchi Polytechnic. *Nigerian Journal of Professional Teacher*, *1*(1), 71-76.

Unin, N. & Bearing, P. (2016). Brainstorming as a way to approach student-centered learning in the ESL Classroom. *Journal of Procedia - Social and Behavioral Sciences* 224, 605-612.

Wagbara, S.O. (2020). Effect of brainstorming strategy on senior secondary school students' academic achievement in chemistry in Rivers State, Nigeria. *Middle European Scientific Bulletin, 4*, 77-82

West African Examination Council (2014). Chief Examiners Annual Report. Lagos: WAEC.

West African Examination Council (2015). Chief Examiners Annual Report. Lagos: WAEC.

West African Examination Council (2018). Chief Examiners Annual Report. Lagos: WAEC.

West African Examination Council (2019). Chief Examiners Annual Report. Lagos: WAEC.

Yara, P.O. & Otieno, K.O. (2010). Teaching/learning resources and academic performance in mathematics in secondary schools in Bondo district of Kenya. *Asian Social Science*, 6(12), 126-132.