

Effect of Brainstorming Learning Strategy on Junior Secondary School Students' Academic Achievement in Social Studies in Yola Educational Zone, Adamawa State, Nigeria

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Abstract — The study investigated the Effect of Brainstorming Learning Strategy on Junior Secondary School Students' Academic Achievement in Social Studies in Yola Educational Zone, Adamawa State, Nigeria. Three null hypotheses were formulated to guide the study. The study adopted a quasi-experimental design, non-randomized pre-test, post-test control group comprising two groups made up of one experimental group and a control group. Four schools and two hundred and three (203) JS II Social Studies Students made up the sample for the study. Four intact classes (two each) were randomly selected and assigned to experimental and control groups. The instrument used for data collection in this study was tagged "Social Studies Achievement Test" (SSAT), constructed by the researcher but patterned in line with BECE test items in Social Studies. The validity of this instrument was established by two experts in counselling psychology and test and measurement. The reliability of the instrument was established using Guttman's Split-Half statistic; which yielded a reliability index of 0.72. Independent samples t-Test and chi-square analysis of data revealed that there was a significant difference in the mean score of students taught social studies using brainstorming learning strategy and lecture method. There was a statistically significant difference in the retention rate of students taught social studies using brainstorming learning strategy and lecture method. There was no significant effect of gender on the academic achievement of students taught social studies using brainstorming learning strategy. Based on the findings, it was recommended that social studies teachers should incorporate brainstorming learning strategy with other instructional approaches in lesson delivery in order to improve students' ability in learning and understanding social studies in junior secondary schools.

Keywords— Academic Achievement; Brainstorming Learning Strategy; Effect of Teaching; Gender.

I. INTRODUCTION

The use of instructional strategies of teaching forms a major topic of discourse in educational researches. Educators have been advocating for a paradigm shift from traditional talk and chalk approach of teaching to an all engagement of students in the teaching learning process. Therefore, there is the need to adopt newer, effective and innovative instructional strategies that will promote

effective teaching learning outcomes of students in social studies. Brainstorming learning strategy is one of such innovative instructional techniques that could be used by teachers to promote effective teaching learning outcomes of students in social studies. It is also an innovative strategy of problem solving where students sit in group and contribute ideas spontaneously and proffer solutions to those problems. 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. Brainstorming is a tool used by teams to bring out the ideas of each individual and present them in an orderly fashion to the rest of the team. The key ingredient is to provide an environment free of criticism for creative and unrestricted exploration of options or solutions. Students would be asked to: think carefully about the question and answer, pair with a partner, share answers with a partner, and prepare to share both answers with the entire class.

Brainstorming is a quick and easy way to generate novel ideas for problem solving and innovation. As the name suggests, Brainstorming is meant to stimulate or excite the brain into thinking about issues in a new way. It encourages learners to arrest conventional, logical thinking and embrace spontaneity, originality, and imagination. Responding to a single, specific problem or question, participants in a brainstorming session express their suggestions or ideas quickly and spontaneously, without much processed thought or reflection. Free association and building on the ideas of others are encouraged; criticism and censorship are forbidden. The focus is on quantity rather than quality, the goal being to generate as many ideas as possible in a short time. The assumption is that the greater the number of ideas generated, the greater the chance of producing a novel and effective solution.

Social Studies is one of the compulsory subjects studied in junior secondary schools in Nigeria. Social studies make the best attempt at answering what makes us humans, and this subject includes a breadth of disciplines covering various aspects of living. The inclusion of social studies in education helps students grow up into informed citizens. Knowledge of the socio-political and economic conditions of their country and the world, and the knowledge of one's rights and duties as an individual in society, helps students become responsible citizens. Through social studies, learners gain knowledge of human behavior and cultural differences that separate individuals from one another. Learners develop increased levels of acceptance for differences between people, be they social, economic or life style-related. Social studies aim at creating educated individuals who can be responsible citizens of their nation. Teaching children social studies increases the possibility of their becoming more aware, more responsible as human beings. Teaching social studies increases chances that students will adhere to ethical and moral values in life. The study of social sciences is necessary, if we want a brighter future for our society. The vital task of preparing students to become citizens in a democratic society is complex. The social studies disciplines are diverse, encompassing an expansive range of potential content. This content engages students in a comprehensive process of confronting multiple dilemmas, and encourages students to speculate, think critically, and make personal and civic decisions based on information from multiple perspectives. A powerful and

rigorous social studies curriculum encourages learners to connect what they are learning to their prior knowledge and to current issues, provides strategies and activities that engage students with significant ideas, to think critically and creatively about what they are learning, and to apply that learning to real life situations [1]. Teaching social studies powerfully and authentically begins with a deep knowledge and understanding of the subject and its unique goals. Social studies programs prepare students to identify, understand, and work to solve the challenges facing our diverse nation in an increasingly interdependent world. Education for citizenship should help students acquire and learn to use the skills, knowledge and attitudes that will prepare them to be competent, good and responsible citizens throughout their lives. Good, competent and responsible citizens are informed and thoughtful, participate in their communities, are involved politically, and exhibit moral and civic virtues. However several factors are known to have negatively impacted on the effective teaching of social studies in Yola Educational Zone. These factors are not strange to the entire educational system in Nigeria.

Schools of Yola Educational Zone may not be an exception to the problems plaguing the entire educational system in Nigeria. These problems include: poor teaching and learning environment, poor welfare packages for teachers, overcrowded classrooms with no sitting facilities, dearth of suitable textbooks, inadequate instructional facilities and inappropriate selection of instructional strategies by teachers. These problems are known to have affected the entire education system as well as students' learning outcomes generally in Nigeria, and particularly, might have impacted on social studies students' learning outcomes in schools of Yola Educational Zone. Presently, students' academic performance in social studies in Basic School Certificate Examinations in Yola Educational Zone is declining, probably, due to improper selection and poor uses of Social studies instructional strategies. Reference [2] stated that lecture, which is currently the predominant teaching approach in Nigerian Secondary Schools is inappropriate and ineffective for achieving the objectives of the social studies curriculum. Students' achievement in Yola Educational Zone has been a source of concern to teachers, parents and all stakeholders in the educational sector, especially as regards to the record of poor achievement of students in external examinations (BECE). Secondary school students in Yola Educational Zone still register continually poor results in social studies at the Basic Education Certificate Examinations (BECE). A lot has been said and done to improve teaching and learning of social studies in Yola Educational Zone but students continue to perform poorly in both internal and external examinations. There is the possibility that students' poor performance may be tied to the strategies adopted by social studies teachers in schools of Yola Educational Zone. If the teachers lack the pedagogical skills to effectively teach the subject in schools,

students' performance in external examinations may be negatively affected. This is because, the quality of education in any society rest on the shoulders of her teachers. Junior secondary schools in Yola Educational Zone seem to lack the basic instructional materials and equipment to effectively teach the subject, raise and sustain students' interests. Studies have shown that students taught by brainstorming learning strategy achieved remarkable results than those taught by traditional chalk and talk approach [3], [4]. However these findings are inconclusive because a likely gap in empirical evidence may exist in Yola Educational Zone. This study therefore focuses on finding the effect of this instructional strategy (brainstorming) on students learning outcomes in social studies in schools of Yola Educational Zone, because, there is that possibility that teachers in schools of Yola Educational Zone might shy away from adopting this instructional technique in teaching social studies, probably due to some of the genuine factors earlier discussed, which has in turn affected students' performance in Basic Education Certificate Examination (BECE). Therefore, the study intends to provide empirical evidence related to the efficacy of brainstorming learning strategy on students' academic achievement in social studies in Junior Secondary Schools of Yola Educational Zone.

Studies on the contribution of gender on students' achievement are numerous [5]. However, findings are inconclusive as to the effect of gender on academic achievement of students. Gender is one of the variables that have been related to differences found in the academic achievement of students in social studies. Several studies have been documented that female students may likely perform poorly in social studies compared to their male counterpart when taught by brainstorming learning strategy. Conversely, other studies have indicated that male and female students would not differ significantly in their performance score when exposed to brainstorming learning strategy. Based on this, one can infer that, due to the role of the girls at home, where they are preoccupied with house chores, they may not have enough time for their books which may affect their contributions during brainstorming sessions in the classroom. Boys in Yola Educational Zone on the other hand may likely perform better than their female counterpart. This claim will always remain as a costly assumption unless empirical evidence is provided. It therefore becomes imperative in this study to determine how gender would affect students' academic achievement in social studies when exposed to brainstorming learning strategy.

Studies conducted in other localities and subject areas have shown the effect of brainstorming learning strategy in promoting effective teaching learning outcomes of students. The involvement of learners in the teaching learning process to share views and contribute ideas during learning of social studies would enhance students' academic achievement because they form a part of the ideas developed. Therefore,

the basic assumption underlying this study is that, brainstorming learning strategy if used to teach social studies, would improve students' academic achievement. In view of this, the study sought to investigate the Effect of Brainstorming Learning Strategy on Junior Secondary School Students' Academic Achievement in Social Studies in Yola Educational Zone of Adamawa State, Nigeria.

A. Purpose of the Study

The purpose of this study is to investigate the effect of Brainstorming Learning Strategy on Junior Secondary School Students' Academic Achievement in Social Studies in Yola Educational Zone of Adamawa State, Nigeria. The specific objectives of the study are to determine:

- (i) The academic achievement of social studies students taught using Brainstorming Learning Strategy and Lecture Method;
- (ii) The retention rates of students taught social studies using Brainstorming Learning Strategy and Lecture Methods;
- (iii) The academic achievement of Male and Female students taught social studies using Brainstorming Learning Strategy.

B. Hypotheses

The following research hypotheses were formulated and tested at 0.05 alpha level of significance:

- H₀₁:** There is no significant difference in the academic achievement of students taught Social Studies using Brainstorming and Lecture Methods.
- H₀₂:** There is no significant difference in the retention rates of students taught social studies using Brainstorming Learning Strategy and Lecture Methods.
- H₀₃:** There is no significant effect of gender on the academic achievement of students taught Social Studies using Brainstorming Learning Strategy.

II. MATERIALS AND METHOD

The study used quasi-experimental research which involved two groups. Specifically, the pre-test, post- test non- equivalent control group design using intact classes.

The design is represented as follows:

$$\begin{array}{ccc} O_1 & X_1 & O_2 \\ O_3 & X_2 & O_4 \end{array}$$

Where:

O_1 and O_3 are Pre-Test Scores for the two groups (Experimental and Control)

O_2 and O_4 are Post-Test Scores for the groups

X_1 = Experimental treatment using Brainstorming Learning Strategy
 X_2 = Treatment to the control group which was Lecture Method.

A. Sample and Sampling Technique

Multi stage sampling technique was used to select two out of three Local Government Areas in Yola Educational Zone of Adamawa State. Four schools were selected; with two schools each from the sampled Local Government Areas. Simple random sampling technique was used to select which schools should be given what treatment. Intact classes were used for the study. Students from the two selected schools in each Local Government Area were assigned the same experimental conditions. A sample of 203 JS II students was obtained from intact classes in the selected schools. Students from two of the intact classes served as the Experimental Group and taught social studies using Brainstorming Learning Strategy ($n = 106$), While students from the other two intact classes served as the Control Group taught social studies using conventional lecture method ($n = 97$). The JS II social studies students were chosen for the study because they have been exposed to social studies in their JS I class. Hence, they were not

sitting for any public examinations like BECE and therefore, have time to participate in the research.

B. Research Instrument

A Social Studies Achievement Test (SSAT) was the instrument for the study. The test consisted of a 31-item objective test and 5-essay items that was constructed by the researcher but patterned in line with BSCE Social Studies test items. The modification involved restructuring and aligning the content to reflect the concepts outlined in the scope of the study. This test was use for a pre-test to determine the comparability of the groups and determine the extent of Social Studies knowledge already possessed by subjects before treatment. The Control Group was taught based on JS I Social Studies syllabus on four content areas namely: (i) information and communication technology, (ii) science, technology and societal development, (iii) social issues and problems, (iii) marriage. The Experimental Group was exposed to the same concepts in social studies using brainstorming learning strategy. Table 1 displays the item specification for the social studies achievement test.

TABLE I. ITEM SPECIFICATIONS FOR THE TOPICS IN THE SOCIAL STUDIES ACHIEVEMENT TEST

Topic	Knowledge (22.2%)	Comprehension (22.2%)	Analysis (22.2%)	Application (22.2%)	Evaluation (11.1%)	Total
Marriage (25%)	2	2	2	2	1	9
Communication (25%)	2	2	2	2	1	9
Science and Technology and Development (25%)	2	2	2	2	1	9
Social Issues and Problems (25%)	2	2	2	2	1	9
Total	8	8	8	8	4	36

C. Validation of the Instrument

The instrument used for the study which is Social Studies Achievement Test (SSAT) was subjected to face and content validity by two experts in counseling psychology and test and measurement in the Department of Science

Education, Adamawa State University, Mubi and two experts with M.Ed. (Social Studies) and a Ph.D. holder at A.B.U Zaria. The experts reviewed the content and the items and offered suggestions for the instrument to be restructured in line with Blooms taxonomy of educational objectives. The validators also looked at the topics and the weeks

specified for the study and offered suggestion for one of the five topics to be dropped to four topics in order to ensure that the content be covered within the time specified. Corrections were made and the final draft of the instrument was ready for pilot-testing.

D. Reliability of the Instrument

In order to ascertain the reliability of the instrument, a pilot study was carried out on forty four social studies students from two schools in Mubi North and Mubi South LGA. These are students who were not part of the target sample. Guttman's split-half method was used to determine the internal consistency of the instrument. It yielded a reliability index of 0.72. This reliability index was considered good for the instrument.

E. Method of Data Analysis

The three null hypotheses generated in this study were tested using two different statistical tools. Hypotheses one

and two were tested using the independent two samples t-Test while Hypothesis three was tested using chi-square statistic. All tests were conducted at 0.05 level of significance. The tests were used to compare the academic achievement of students in the two treatment groups (Brainstorming Learning Strategy and Lecture Method).

III. RESULTS

The pre-test scores of students in the experimental and control groups were analyzed using Independent Sample t-Test Statistic. This was done in order to determine the entry knowledge of students in social studies before administering the treatments. Students' pretest scores in the Experimental (N = 106) and Control (N = 97) Groups were analyzed using the Independent Sample t-Test Statistic. The results are hereby presented in Table 2.

TABLE II. SUMMARY OF T-TEST ANALYSIS OF STUDENTS' PRE-TEST SCORES IN BRAINSTORMING LEARNING STRATEGY AND LECTURE METHOD

Source	N	$\bar{X}$	Mean Difference	SD	df	t	Sig. (2-tailed)
Brainstorming Learning Strategy (X ₁)	106	23.169		12.227			
Lecture Method (X ₂)	97	22.412	0.757	14.084	201	0.410	0.682

Not Significant; $p > 0.05$.

Table 2 shows that there is no significant difference in the pretest mean scores of students taught social studies using brainstorming learning strategy and students taught by lecture method ($t = 0.410$, $df = 201$, $p > 0.05$). This shows that students in the experimental and control groups had similar entry behaviour prior to the treatment.

A. Hypothesis Testing

1. Hypothesis One

There is no significant difference in the academic achievement of students taught Social Studies using Brainstorming Learning Strategy and Lecture Method.

TABLE III. SUMMARY OF T-TEST ANALYSIS OF STUDENTS POST TEST SCORES IN BRAINSTORMING LEARNING STRATEGY AND LECTURE METHOD

Source	N	$\bar{X}$	Mean Difference	SD	df	t	Sig. (2-tailed)
Brainstorming Learning Strategy (X ₁)	106	49.6		20.426			
Lecture Method (X ₂)	88	31.484	18.204	20.507	201	6.331	0.000*

*Significant; $p < 0.05$.

Hypothesis one sought to determine if a significant difference exists in the achievement of students taught social studies using Brainstorming Learning Strategy (N = 106) and those taught using Lecture Method (N = 97). Students'

post test scores in social studies were computed using t-test statistical method. Table 3 shows the findings.

Table 3 indicates that there is a significant difference in the students' academic achievement in the experimental and control groups taught social studies between the two

treatments. By implication, this means that students exposed to learning social studies by brainstorming strategy performed better than their counterpart in the lecture group at a statistically significant level ($t = 6.331$, $df = 201$, $p < 0.05$).

2. Hypothesis Two

There is no significant difference in the retention scores of students taught social studies using Brainstorming Learning Strategy and Lecture Methods.

TABLE IV. SUMMARY OF T-TEST ANALYSIS OF STUDENTS' RETENTION SCORES IN BRAINSTORMING LEARNING STRATEGY AND LECTURE METHOD

Source	N	Mean	SD	df	t	Sig. (2-tailed)
Brainstorming Learning Strategy (X ₁)	106	34.613	13.645	201	5.971	0.000*
Lecture Method (X ₂)	97	23.309	13.283			
		11.304				

*Significant; $p < 0.05$.

Table 4 shows that there is a significant difference in the retention scores of students taught social studies through brainstorming and lecture method. Students in the experimental group gain better material retention in social studies than students in the control group ($t = 5.971$, $df = 201$, $p < 0.05$).

3. Hypothesis Three

There is no significant effect of gender on the academic achievement of students taught social studies using Brainstorming Learning Strategy.

TABLE V. SUMMARY OF CHI-SQUARE TEST OF POST TEST SCORES IN BRAINSTORMING LEARNING STRATEGY OF MALE AND FEMALE STUDENTS IN SOCIAL STUDIES

Source	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.909 ^a	42	.919
Likelihood Ratio	40.283	42	.547
Linear-by-Linear Association	.009	1	.924
N of Valid Cases	106		

Not Significant; $p > 0.05$. 86 cells (100.0%) have expected count less than 5. The minimum expected count is .46.

The result in Table 5 indicates that there is no significant gender difference in academic achievement of students taught social studies using Brainstorming Learning Strategy ($\chi^2 = 29.909$; $df = 42$, $N = 106$; $p > 0.05$). The result could imply that the male and female students in the treatment had equivalent learning achievement.

To test the third hypothesis, the retention scores of students in knowledge and comprehension items exposed to brainstorming learning strategy and lecture method were analyzed using t-test statistical technique. The aim was to find out if there was significant difference in the retention rates of students. The result of the analysis is as follows:

Hypothesis three sought to determine if significant difference exist in the mean scores of male and female students taught social studies using brainstorming learning strategy. The post test scores of the one hundred and six students in the brainstorming learning strategy analysed on gender basis using the chi-square statistic. The data were presented in a 2 x 43 contingency table and the results are presented in Table 5.

IV. DISCUSSION

This study investigated the effect of brainstorming learning strategy on junior secondary school students' achievement in social studies in Yola Educational Zone of Adamawa State. The pre-test result provides an idea of the academic status of the treatment groups in the study. The result showed that both the control and experimental groups

had equivalent entry knowledge before treatment ($t = 0.410$, $df = 201$, $p > 0.05$).

The result from the first finding indicate that there is a significant difference in the academic achievement of students exposed to social studies through brainstorming learning strategy and those exposed through the use of the lecture method ($t = 6.331$, $df = 201$, $p < 0.05$). This means that, the students exposed to social studies through brainstorming learning strategy performed significantly better than those exposed through the use of the lecture method (talk and chalk). It implies that the brainstorming learning strategy could be a better strategy to enhance learners' academic achievement in social studies than the lecture method. This finding supports that of [3], [6] and [7] that showed statistically significant differences in the achievement mean score of students in favor of the experimental group that studied using the brainstorming.

This study has shown that there is a significant difference in the retention scores of students taught social studies through brainstorming learning strategy and lecture method ($t = 5.971$, $df = 201$, $p < 0.05$). This connotes that students in brainstorming group were capable of acquiring and comprehending the topics taught to them than their counterpart in lecture method group. This is to further stress that the students in the experimental group had a better understanding of the material taught them which showed in their retention scores. This finding corroborates that of [8] which showed that brainstorming would facilitate grasping of new concepts while inappropriate teaching methods are likely to constrain knowledge retention and application. The finding also corroborates that of [9] which emphasized that good activities develop deep understanding of the important ideas to be learned.

Finding from this study also shows that there is no significant difference between male and female students' academic achievement in social studies taught using brainstorming strategy. That is, both male and female students in the experimental group performed better equally ($\chi^2 = 29.909$; $df = 42$, $N = 106$; $p > 0.05$). This connotes that with the use of the brainstorming learning strategy, gender differential is not a barrier in social studies. This finding is consistent with those of [10], [7] who found no statistically significant difference in the performance of male and female students taught using brainstorming strategy. The finding also supports that of [11] which showed that no significant difference occurred between the performance of male and female students in a study in computer. Contrary to this finding, some studies however have shown that significant gender differences exist during the instructional process. For instance, [12] found out that significant gender differences in academic performance of students exists in mathematics. This is in direct contrast to the findings involving the brainstorming learning strategy in the current study.

V. CONCLUSION

The brainstorming learning strategy is a significantly better teaching technique than the lecture method. It can be concluded that brainstorming learning strategy plays a significant role in improving students' general performance in social studies because it enhances the confidence and communication skills of the students. The study also reveals that there would be no significant difference between the male and female students' academic achievement in social studies when teachers use brainstorming learning strategy. The strategy therefore would break the dichotomy of male female students' academic achievement in social studies. This shows that this instructional technique is 'gender all-encompassing'. Students taught social studies using brainstorming learning strategy gain greater material retention than those taught by the method. This implies that brainstorming learning strategy improves students understanding and retention of concepts in social studies than the traditional lecture approach. Social studies teachers could get better output of their students if they incorporate this instructional strategy in their daily instruction in schools when teaching social studies.

VI. RECOMMENDATIONS

Based on findings of this study, the researcher makes the following recommendations.

Social studies teachers should incorporate brainstorming learning strategy with other instructional approaches in lesson delivery in order to improve students' ability in learning and understanding social studies in junior secondary schools.

The brainstorming learning strategy has been shown to promote effective learning outcomes of students in social studies; therefore it would be necessary to conduct periodic workshops and seminars for teachers in junior secondary schools teaching social studies so as to keep them abreast with such innovative teaching strategies.

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