

**EFFECT OF BRAINSTORMING ON STUDENTS' ACADEMIC ACHIEVEMENTS IN ECONOMICS
IN SECONDARY SCHOOLS IN BAUCHI STATE OF NIGERIA**

BY

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Abstract

This study examined the effect of brainstorming on students' achievement and in economics in senior secondary schools of Bauchi state, Nigeria. To achieve this, two objectives and two research hypotheses were formulated to guide the study. Literatures were reviewed in the areas related to the study. Non-equivalent control group of quasi-experimental design was used as the design of the study. The area of the study is Bauchi State, Nigeria. The population of the study comprises of 15,832 SSII senior secondary school students that are offering economics. A simple random sampling technique was used in selecting two schools from three educational zones. 104 students from two intact classes that were assigned in to experimental group and control group was used as a sample of the study. The research instrument is Economics Achievement Test (EAT) questions were adopted from previous WAEC and NECO examinations questions related to the topics taught. The instrument was administered by the researcher with the help of two research assistants. The data collected was analyzed using mean and standard deviation while, the null hypotheses were tested using T-test at 5% level of significant. the findings revealed that posttest mean achievement score of experimental group is significantly higher than the posttest mean achievement score of control group, this showed that, the students taught using brainstorming have better academic achievements than students taught using conventional method. The study recommends among others that; Teachers should ensure that low-achieving economics students are exposed to instruction in brainstorming to equip them with the best learning skills.

Keywords: Expeditionary learning, Brainstorming, Achievement, Economics and Secondary school

Introduction

Education is widely accepted as the key determinant of any meaningful development. It is the most important weapon to bring changes in the society by removing orthodoxy and superstitions, and make people wise and rational (Islam & Khan, 2017). To achieve this, the National Policy on Education (NPE 6th Edition 2013) enunciate the guideline, objectives, standards, structures, strategies and management for achieving the national educational goals in Nigeria (NPE 6th Edition 2013). The 9-3-4 years Universal Basic Education (UBE) system formulated by the NPE implies that, every child will spend 9-years of basic and compulsory education from primary to Junior Secondary School (JSS) level, 3 years in the senior secondary school level and 4-years in the tertiary institutions (Isaac, 2019).

Economics is one of the subjects which fall within the second level of education that is, the three (3) years of senior secondary schools' system (Isaac, 2019). It is very essential for business organization. The ideas of teaching and learning economics in classroom is to help the basic stage of students master the principles for understanding the financial problems and precise economic issues (Khadija, 2020). There has been a series of research work on improving the achievement of students in economics. Despite all the tremendous effort made by the State Government in Bauchi State towards boosting teaching and learning of economics by employing economics teachers, supply of economics textbooks, renovation of schools, appropriate training and re-training of economics teachers, scholarship to best graduating students in economics and so on, but the West African Examinations Council (WAEC) and National Examinations Council (NECO) results seems discouraging in the last three Years from 2018, 2019 and 2020 respectively (Source: Chief Examiners' Report 2021, Bauchi State Ministry of Education).

According to the reports, many factors may be responsible for the weaknesses of candidates in economics subject ranging from government policies, quality of teachers, teaching and learning environments, school size, school type inadequate economics curriculum/syllabus coverage, lack of adequate preparation for the examination and above all is the use of inappropriate method of teaching. Many researchers have connected that, most teachers in Nigerian secondary school predominantly use the conventional teaching method like

lecture method in teaching due to poor knowledge and none exposure to other learner centered method leading to poor achievement (Khadija, 2020). Several studies like (Seyi, 2014 & Ezeagba, 2019) have documented that, the quality of instructional method used by secondary school teachers is a key determinant of students' academic achievement.

In today's world, the conventional approaches to teaching and learning economics, is becoming increasingly inefficient in the face of complex and dynamic daily experiences (Wagbara, 2020). This underscores the need to evolve and derive interest in innovative and constructive solutions to this life's challenges (Clifford, Abraka, & Joseph, 2019). Researchers such as Niba and Mona (2018); Wagbara, (2020) have shown that, innovative and productive instructional strategies of teaching such as expeditionary learning, simulation method, brainstorming, inquiry strategies, concept mapping, and modeling are capable of improving students' achievement. Researchers such as Jacob, Joel, Sababa, & Ndatuwong (2016) agreed that, the choice of effective instructional methods is not only to improve the level of achievement of students in the preparation period, but also to become part of the preparation program and to be helpful in the future practice of education. Mona (2018) added that this effective instructional method of teaching such as brainstorming is based on the interaction between the teacher and the learner or between the learner and other learners, as this helps in the development of thinking methods or reduce the methods of automation that are given in one direction from the teacher to the learner

Brainstorming is not just a way to encourage new ideas, but also to encourage all participants to contribute to teamwork (Wagbara, 2020). Fontaine (2017) stressed that, brainstorming is a way of bringing ideas without consideration of their evaluation. This does not mean leaving the evaluation, but only postponing it to the end of the session (Wahib & Zidane in Nibal *et al*, 2017). Other researchers such as Salihu (2020); Wagbara, (2020) suggested that brainstorming method should be used in teaching and learning because students will actively participate in the teaching and learning process. Nevertheless, there are no empirical study to the best of the researcher knowledge tested the effects of brainstorming on students' academic achievement of secondary school students in economics in Bauchi state. The present study, therefore, addressed this gap.

Objectives of the Study

The main purpose of the study is to determine the effect of brainstorming on students' achievement in economics in senior secondary school in Bauchi state, Nigeria. Specifically, the study sought to:

1. Determine the difference between pre-test mean achievement scores of students of Economics in brainstorming groups and those in conventional method group before the treatment.
2. Find out the difference between post-test mean achievement scores of students taught Economics using brainstorming method and those taught using conventional approach.

Null Hypotheses

In line with each research questions, the following research hypotheses were formulated at 0.05 level of significance;

H₀₁: There is no significant difference among the pre-test mean achievement scores of students of economics in brainstorming groups and those in conventional method group before the treatment.

H₀₂: **H₀₃:** There is no significant difference between post-test mean achievement scores of students taught Economics using brainstorming and those taught using conventional approach.

Literature Review

Brainstorming as a Teaching Strategy

The approach of brainstorming in education is the modern methods that persuade creative thinking and let go the potential when educated in an atmosphere of liberty and security allows the appearance of all views and ideas so that the learner at the top of the communication and interaction with the circumstances and fit this approach in the issues and topics open that have no answer (Tayyaba Zarif, 2013). Brainstorming is one of the innovative strategies that organize learners into large or small group that indulges in activity that encourages learners to focus on a task and contribute to free flow of ideas (Ajeyalemi and Owoyemi, 2014 in Wagbara 2020). To Malkawi and Smadi (2018), "Brainstorming is a special way to develop creative thinking as it peculiarly involves working on flow of ideas without criticism as participation of the learners spread thinking and challenges their minds (Hassanin, 2002 cited in Malkawi and Smadi, 2018).

According to Mohammad (2016), he defined Brainstorming as a conglomeration of a relaxed informal approach to problem solving, thinking and lateral performance. Al-Maghrawy, (2012) also defined Brainstorming as a group creativity forum for general ideas. Brainstorming (BS) is one of the techniques for fostering group creativity by which ideas and thoughts are shared among members spontaneously in order to reach solutions to practical problems (Gogus, 2012). Brainstorming is a creative process for generating ideas that encourages quantity over quality and discourages criticism and evaluation (Rahim, 2019). Rahim added that, a key

ingredient for success is allowing ideas to build on each other. As a result, the Brainstorming sessions became more appropriate for increasing productivity in a learning-specific situation (Unin & Bearing, 2016).

Many previous studies (e.g., Drapeau, 2014; Michinov, Jamet, Metayer, & Le Henaff, 2015; Schlee&Harich, 2014) have claimed that, the process involved in the idea generation task may potentially play an exceptional role in stimulating individuals' ability to produce creative solutions that can be further evaluated and, eventually, applied in practice. According to Morrison (2016), Brainstorming is an approach or technique that can be an effective way of generating many ideas on a specific issue which can then be filtered and reviewed to determine which idea or approach is the most appropriate. On her own, Tayyaba Zarif (2013) sees Brainstorming as a technique often used by groups, but can be done alone (although this is not as effective) to generate a large number of ideas for the solution of a problem. Very commonly, the individuals' ability during the BS session is measured based on the quantity or uniqueness of the generated ideas (Fu *et al.*, 2015). The brainstorming method is a technique or way of teaching that is used in group discussions to generate new ideas, thoughts, or ideas by throwing a problem into students by the teacher, then students answer or express the opinion or Comments so that the problem develops into a new problem (Teamviewer, 2019).

The brainstorming method is similar to the discussion method, where the goal is to gather ideas and opinions of information, knowledge, experience, from all participants. On the method of discussion, the idea of a person can be responded to (supported, supplemented, reduced, or disagreed) by another participant, but on the brainstorming method of others' opinions are not to be responded to (Teamviewer, 2019). Quantity of ideas is estimated based on the number of solutions delivered by a group or individual students. The uniqueness of ideas, however, is estimated based on certain dimensions related to novelty, workability, relevance, and specificity of ideas (Hong & Chiu, 2016).

Brainstorming is the random generation of ideas based around a topic (anonymous, 2021). The authors said that, there is no editing or ordering of ideas but, they may then be used as the basis for another activity such as writing or discussion. It is often very productive as a whole-class activity (anonymous, 2021). For example, learners brainstorm the topic of smoking by writing all the words they associate with it on the board. This is then followed by a discursive essay-writing lesson on the topic.

According to Roestiyah (2012), brainstorming is a technique or way of teaching conducted by teachers in the classroom, by throwing a problem into class by the teacher, then learners answer or express an opinion, or comment. Roestiyah added that, the problem develops into a new problem, or it can be interpreted as a way to get the idea of a group of people in a short period of time. On the other hand, Sutikno cited in Teamviewer (2019) defined brainstorming as a form of discussion in order to gather ideas, opinions, information, knowledge, experience, from all participants. Sutikno said that, unlike discussions, where the idea of a person can be responded to (supported, supplemented, reduced, or un agreed) by another participant, on the use of brainstorming methods, others are not to be responded to. Also, Minter and Reid in Teamviewer (2019) sees brainstorming as another way that companies use to produce ideas today. Minter and Reid thereafter explained Brainstorming as collecting a group of people, with the goal of producing new and fresh thoughts.

In line with Minter and Reid assertion, Aqib (2013) also defined brainstorming as a technique or way of teaching performed by teachers in the classroom. Aqib (2013) further expressed that, this method is done by throwing a problem into the student by the teacher, and then the student responds or expresses the opinion, or comments so that the problem may develop into a new problem. According to Kapur, &Toh, (2015). Groups can multiply their creative results by brainstorming, where brainstorming works by focusing on problems, and then freely popping up as many solutions as possible and expanding them as far as possible. Brainstorming is an excellent teaching strategy to generate ideas on a given topic. Osborn added that, Brainstorming helps promote thinking skills because, when students are asked to think of all things related to a concept, they are really being asked to stretch their thinking skills. Brainstorming promotes success for students with special needs as there is no one right answer (Roestiyah, 2012).

According to Morrison (2016), Brainstorming is an excellent strategy to use in the inclusive classroom, tap into prior knowledge, Give all students a chance to express their ideas, Eliminate fear of failures, Show respect for each other, Try something without fear, Tap into individuality and creativity and Eliminate the fear of risk-taking. Morrison continued that, some basic rules to follow when conducting a brainstorm in the classroom with a small or whole group of students include: No wrong answers, getting as many ideas as possible, Record all ideas as well as not expressing ones evaluation on any idea presented and once the brainstorming activity is done, one have a great deal of information on where to take the topic next (Teamviewer, 2019). In the classroom, Brainstorming can encourage learners to think more freely and creatively than if they were doing a more controlled planning exercise (anonymous, 2021). The authors emphasized that, it allows learners to

remember what they know, and to teach each other. For this study, brainstorming in an expeditionary learning is a strategy that organizes learners into participatory small or large groups that indulges in critical thinking that could enhance free flow of ideas among them as they interact with the teacher.

In a task that involves the teacher in brainstorming, the teacher should emphasize on active listening during the session to provide an opportunity for learners to share ideas and expand their already built knowledge by building on one another contributions. At the end of a brainstorming session, if one goes through the results and evaluate the responses, you will observe attainment of best idea and development of new ideas by the use of the ideas introduced during the session (Abdelkader, 1997, Kittami, 2001, Ajeyalemi and Owoyemi, 2014).

Academic Achievements

There is diverse definition offered by different scholars and educationists, Academic achievements may be defined as the outcome of teaching and learning. it is the extent to which a student, teacher or institution has achieved their educational goals (Abdulkareem, 2016). Here, academic achievements is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important it includes procedural knowledge such as skills or declarative knowledge such as facts (cognitive domain) (Kenter, 2012). In similar vein, Bell (2012) defined Academic achievement as the ways or strategies students use to deal with their studies and how they cope with or accomplish different tasks given to them by their teachers. Academic achievement is the ability to study and remember facts and be able to communicate knowledge verbally or on paper (Abdulkareem, 2016). Abdulkareem also stated that, in educational institutions, success is measured by academic performance, or how well a student meets standards set out by local government and the institution itself. As career competition grows ever fiercer in the working world, the importance of students doing well in school has caught the attention of parents, legislators and government education departments alike.

According to Fam *et al* (2016), academic achievement is the extent to which a student, teacher or institution has attained their short or long-term educational goals. Completion of educational benchmarks such as secondary school diplomas and bachelor's degrees represent academic achievement (Fam, *et al*, 2016). Academic achievements is commonly measured through examinations or continuous assessments but there is no general agreement on how it is best evaluated or which aspects are most important-procedural knowledge such as skills or declarative knowledge such as facts. Furthermore, there are inconclusive results over which individual factors successfully predict academic performance, elements such as test anxiety, environment, motivation, and emotions require consideration when developing models of school achievement (Fam, *et al.*, 2016). Academic achievement according to Jillard. Mercado, Rozette. Mercado, Jaypee. Julve and Geraldine, Naga (2018) is frequently defined in terms of examination performance. In this study academic achievement was characterized by achievement in tests, in course work and achievement in examinations both internal and external.

Achievement has been conceptualized into several ways. Grounlund (1981) and Slavin (1995) defined achievement as the accumulated knowledge and skills that students are able to demonstrate after learning a specific task. It is the extent to which a student accomplishes a specific learning objective within instructional environment, especially in school, college, and university (Chase, 2018; Okonkwo, 2020; Wood & Gentile, 2016). Achievement is a particular knowledge or skill that a learner is expected to demonstrate after a period of study (Ebel&Frisbei, 1991; Nwagbo, 2016). The students' achievement is commonly measured by test or examination (Adekunle, 2014). Academic achievement according to Jacobs (2018) depicts students' achievement on a measurement such as achievement test, skill test, analytical thinking test etc. It is therefore, not out of place to describe academic achievement as gain in knowledge of students as a result of taking part in a learning activity or programmed. Academic achievement is a result-oriented construct that encapsulates the extent of achievement in a desired task (Rix, 2020). Ogunsaju (2014), states that the academic standard in all Nigerian institutions has fallen considerably below societal expectations. The learning of Government in secondary schools has not fared well in view of the end product resulting in the lack of understanding and consequently poor achievement and total nonchalance in the discharge of civic duties and responsibilities which the subject has as its cornerstone objective (Ugwu, 2013). Most students graduate from school without being able to exhibit the expected behaviour. Unfortunately, evidence from literature showed that most teachers in Nigerian secondary school predominately use the conventional teaching method in teaching due to poor knowledge and none exposure to other learner centered method leading to poor achievement and retention (Anderson & Freedman, 2017; Omoniyi, 2016).

Methodology

The population of the study consist of 15,832 SSII students that offer economics in all the 205 secondary schools in Bauchi State for 2022/2023 session. The study considers SS II students due to the fact that students at

this level are not under pressure of preparing for external examination (Akanbi& Kolawole in Babaji, 2019). Another reason for choosing SS II students is because most of the studies related to students’ achievement that were conducted in senior secondary schools in Nigeria used SS II in their studies, Inuwa, 2018; Ekeyi, 2013; Ibraheem, 2011. For the sampling technique, Simple random sampling technique was used in selecting the two intact classes of SS II Economics students in the three educational zones in Bauchi state

The present study adopted quasi experimental design. Specifically, non-equivalent control group to examine the effect of brainstorming on students’ achievement in economics in senior secondary school in Bauchi state, Nigeria. In quasi-experimental design, specifically non-equivalent control group design, a researcher uses intact class in the selected schools for a study instead of creating groups. (Gopalan, 2020). Charagu (2015) highlighted that quasi- experimental research focuses on the possible influence an independent variable causes on the dependent variable upon manipulation. Sambo (2005) added that, in quasi-experimental design the researcher deals with class as an intact group. Since school authorities will not allow the researcher to disrupt normal classroom setting for the purpose of creating the groups through randomization

The instrument for data collection was Economics Achievement Test (EAT). EAT consist of 40 multiple choice questions. The questions were adopted from the West African Examinations Council (WAEC) and National Examinations Council (NECO) past examinations based on the topics covered during the study. The questions were adopted from WAEC and NECO because their examinations questions were carefully designed by the curriculum/test experts, usually with a try-out, analysis and revision (Ogologo & Wagbara 2020) The instrument undergo both face and content validation. The face validity was done to check the organization of the test items and the appropriate use of language to the respondent. While, the content validity was carried out to find out if the contents are in conformity with the purpose for which it was design for and the items are spread to cover the selected areas in the content. Cronbach Alpha and split half method were used in ascertaining the suitability of the research instrument

In the first week of the study, the researcher created a rapport with each of the school randomly selected for the study and trained a research assistant (Economics teacher) in each selected school that assisted in the study. In the next stage, the researcher administered the pre-test with the help of the research assistant which lasted for 40 minutes each. The scripts of the test were collected and marked by the researcher. In the second stage, the research assistants taught the two groups in their respective schools for the period of 4 weeks. The students in the experimental group were taught using Brainstorming method, while those in control group were taught using conventional teaching method. At the end of the four weeks teaching, the post-test achievement test was administered to all the groups. The whole exercise lasted for five weeks. The Data collected from both the experimental group and control group was analyzed using mean and standard deviation and the hypotheses were tested using T-test at $P > 0.05$ level of significance. With regard to hypotheses, any null hypothesis with a P-Value of less than 0.05 was rejected while any null hypothesis with a P-Value of 0.05 and above was accepted. The statistical package for the social science (IBM SPSS) version 27 was used throughout the process.

Results

Null hypothesis 1

H_{01} : There is no significant difference between the pre-test mean achievement scores of students of economics in experimental groups and control group.

Independent samples *t-test* was performed to test the difference in the pre-test scores of economics students in brainstorming and conventional method group students. The result in Table 1 indicated that statistically there was non-existence of significant difference in the pre-test scores of *Brainstorming* ($M = 14.64, SD = 5.079$) and *conventional method* of ($M = 14.52, SD = 4.793$) with mean difference of and Pvalue of .868 which is greater than 0.05. The study therefore, failed to reject the null hypothesis 1. This suggested that the students of brainstorming and conventional method have almost similar entry knowledge at the start of the experiment, they are equal statistically in terms of their economics achievement.

Table 1: Independent samples *t-test* of pre-test scores of brainstorming instructional method and conventional method students

Variable	Groups	Levene's Test for Equality of Variances						
		N	Mean diff.	Sig.	t-value	Mean	SD	Sig. (2-tailed)
Pre-test	<i>Brainstorming</i>	42	.120	.004	.490	14.64	5.079	.868
	<i>Conventional method</i>	62				14.52	4.793	

Source: Fieldwork 2023

Null hypothesis 2

H₀₃: There is no significant difference between post-test mean achievement scores of students taught Economics using brainstorming and those taught using conventional approach.

The evidence from the statistical outcome documented in Table 2 indicated that there is existence of a statistically significant difference between the posttest mean achievement score of brainstorming students (M = 29.81, SD = 2.830) and conventional method students (M =23.42, SD = 4.047) with Mean Diff of 6.390 and P.Value of .000. The null hypothesis 2 is therefore, rejected. This finding suggested that brainstorming method had a significant effect on academic achievements of secondary school students in economics.

Table 2: Independent samples t-test of posttest mean achievement score of brainstorming instructional method and conventional method group

Variable	Groups	Levene's Test for Equality of Variances						
		N	Mean diff.	Sig.	t-value	Mean	SD	Sig. (2-tailed)
Posttest	<i>Brainstorming</i>	42	6.390	.921	9.241	29.81	2.830	.000
	<i>Conventional method</i>	62				23.42	4.047	

Source: Fieldwork 2023

Discussion

The finding of research question 3 and its corresponding hypothesis disclosed that brainstorming had a significant effect on academic achievements of secondary school students in economics than those in conventional method. The finding is consistent with the study of Abdulazeez; Tanko and Otuyo (2017) in mathematics, which showed that there was a significant difference between the mean attitude scores of students taught using brainstorming as an instructional strategy and those taught with conventional method. Similar finding was reported by Atsuwe and David (2021) in physics at Makurdi, Benue state.

The study showed that there is more improvement in the academic performance of students based on brainstorming strategy than those taught based on the conventional teaching method. The finding concurred with the study of Salihu (2020), who concluded that brainstorming and concept mapping were more effective in enhancing students' achievement, in Social Studies than conventional instructional strategy. The finding of current study is agreed with that of Wagbara (2020), Jacob and John (2020), Cobra, Mojtaba, Faribaani, and Shahla (2013)

Conclusion

The empirical evidence is provided in this study on the effect of brainstorming on students' academic achievement in economics in senior secondary school in Bauchi state, Nigeria. The data of this study were collected from the subjects of the study (SSII economics students) through the research assistants (economics teachers) using quasi-experimental design. The findings of the present study suggested that brainstorming had a significant effect in improving the achievement of economics students of secondary school. Therefore, the achievement of senior secondary school students in economics that has persistently remained discouraging over the years especially in their national examination can be significantly improved when taught using brainstorming.

Recommendations

1. Economics teachers in Bauchi state should be directed by the state ministry of education to use brainstorming in teaching economics to secondary school students in order to improve their achievement in the subject.
2. Bauchi state ministry of education should organize from time to time on the seminar and workshops to equip economics teachers with the necessary competencies to implement the method of brainstorming in teaching economics to secondary school students.
3. Nigerian education research and development council should consider the review of economics curriculum of secondary school to incorporate brainstorming as method of teaching economics in secondary schools.

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