



Effect of Brainstorming Technique on Study Habit among Secondary School Students in Anambra and Enugu States

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Authors' contributions

This work was carried out in collaboration between both authors. Author LIA designed and searched for the literatures in the study. Author AA wrote the protocol and managed the proof reading of the study. Also, author LIA managed the analysis of the study. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: The general purpose of this study is to determine the effect of brainstorming techniques on secondary students study habit.

Study Design: The study adopted the quasi-experimental (pre-test-post-test control group) design.

Place and Duration of Study: 800 senior secondary school II students from Anambra State and Enugu State of Nigeria, between February 2019 and August 2019.

Methodology: This study on effect of brainstorming technique on secondary school students study habit adopted the quasi-experimental research design, more specifically the non-randomized pre-test – post test control group design. Quasi-experimental study is a type of experimental study that determines the effect of a treatment paradigm on a non-randomized sample. The sample for the study was 800 senior secondary schools students (350 male and 450 female). The study habit inventory questionnaire with a reliability index of .897 was used in data collection. Mean and standard deviation was used in answering the research questions while ANOVA was used in testing the null hypothesis.

Results: At 0.05 level of significance, the analysis of the data collected revealed a mean gain of 38.13 between the control and experimental groups, and a difference in mean gain of 4.61 for male and female students. This indicates that brainstorming was more effective for the experimental group and further shows that the effect differs with respect to gender. The findings revealed there was no difference in the mean post test scores of students who received treatment using brainstorming technique and those in the control group ($p = 0.416, 0.05$) also there was a significant difference in the mean post test scores of male and female secondary school students ($p=0.026, 0.05$).

Conclusion: The study concluded that brainstorming technique is effective for improving secondary school students study habit.

Keywords: Brainstorming; technique; counselling; study habit; secondary school; students.

1. INTRODUCTION

Taking a walk down memory lane it could be observed that each century has witnessed different transformations. Accordingly, there seems to have been emphasis and shift in the educational processes. Education is an activity or process which modifies the behaviour of an individual from instinctive to human behaviour. This definition reveals the innate truth that education aims at discovering aptitudes as well as to progressively prepare man for social activity; in view of this, education through which the basic needs (food, shelter and clothing) are provided is necessary for the survival of a given society.

Brainstorming instructional technique is one of the well-known tools for creative thinking. Brainstorming as an instructional technique was first introduced by Alex Osborne in the 1930s. Brainstorming is a technique used in groups in order to support creative problem-solving, the generation of new ideas and greater acceptance of proposed solutions. Osborn claimed that brainstorming was more effective than individuals working alone in generating ideas, although more recent research has questioned this conclusion [1]. Further describing the concept of brainstorming, Osborn felt that the creative productivity of groups was often hindered due to the primarily evaluative orientation of most meetings. Osborn's popular metaphor for this condition was described as driving with breaks on. Osborn designed the brainstorming session as a creative conference for the sole purpose of producing a checklist of ideas which can subsequently be evaluated and further processed. Brainstorming was identified as only one of a variety of tools for generating ideas, and idea generation was outlined as only one aspect of the entire creative problem solving process. In a nutshell, the

brainstorming technique is based on the capacity of the human brain to make certain association.

Overtime, brainstorming instructional technique has shown to improve students' achievement in diverse fields of human endeavour [2]. Similarly, brainstorming is an activity that stimulates the mind and produces multiple ideas around the topic. It is a strategy used to generate a number of ideas to help solve a particular problem. The technique has been around for long and still in use to engage students in solving a wide range of problems. This also implies that brainstorming technique is generally used in an individual or group setting, to quickly generate a large number of ideas about a specific problem or topic. It can help to encourage creative thinking and generate enthusiasm in learners, encourage participation and building on the ideas of others. Students' interaction is an important part of developing the cognitive skills involved in generating ideas. Buttressing further, a study carried out by [3], on the comparative effects of simulation games and brainstorming instructional strategies on junior secondary school students' achievement in social studies in Nigeria revealed a significant main effect of the treatment on students' achievement in social studies.

Generally, the use of brainstorming instructional technique involves the following stages; Stage one: introducing the brainstorming rules: The first stage consists of introducing the rules. By writing the list of rules on the whiteboard, we can direct the class processes. When students see the rules, they try not to deviate from the main route. Stage two: stating the subject or problem: In this stage, the teacher should select a topic for which there are no explicit materials in the book. Students should have at least a little information about the topic. Topics about which students have no knowledge are not suitable. Also, topics

which have only a few specified solutions are not suitable. In order to begin, you can give the students some concise introductory but interesting information about the topic. It is recommended that a set of thought-provoking questions be prepared for this stage. Stage three: expressing ideas: This can be done in different ways. One way is that a person presents his/her idea and then the next person takes turns to do the same, hence a revolving current of expressing ideas. Stage four: exhibiting ideas for combination and improvement: So far many ideas have been presented. Now ask the group to screen and refine ideas, that is, to discard repetitious, similar, or inappropriate ones. Be careful not to discard original, creative ideas just because of being unusual. Stage five: evaluating ideas: Now we have a number of classified ideas. Some people mistakenly believe that group brainstorming is the whole process of problem solving; while actually, it is just one of the stages of idea seeking, the latter itself being just one of the stages of creative problem-solving [4].

Generally, secondary schools are established with the aim of imparting knowledge, value and norms in the student's inherent. Literatures have shown that student's academic achievement in secondary schools constantly declines. Furthermore, in secondary schools, high academic achievement and overall performance has been attributed to some factors with student's effective study habits taking lead. This results in teachers trying to adopt different teaching and learning techniques in order to help students learn and maintain a particular study habit. In a similar view, [5] observed that multiple reports indicate that academic success cannot be predicted by a single variable. It is dependent upon many factors; both cognitive, and non-cognitive, and corresponding reports however have indicated that cognitive factors are responsible for academic success but it has not been the same for the non-cognitive factors like study habits, skill and study motivation, among other attitudinal constructs. According to Ogbodo [6], habit is a pattern of activity which through repetition, has been learned to the point that it has become automatic and can be carried on with a minimum of conscious effect.

Buttressing further, [7] posited that study habit is a pattern of behaviour adopted by students in the pursuit of their studies that serves as the vehicle of learning. It is the degree to which the student engages in the routines (for instance reviews of

materials, frequency of studying sessions) occurring in an environment that is conducive to studying. Various studies carried out by [8,9] and [10] have shown that there is a positive relationship between study habits and academic performance of students. Effective study habit refers to a situation in which a learner studies regularly to achieve maximum success in their school work.

In view of these, study habit refers to learning activity which leads to the achievement of a learner's goal through a prescribed pattern of stable behaviour. Study habits is a well planned and deliberate pattern of study, which has attained a form of consistency on the part of students towards understanding academic subjects and passing examinations [11]. Undoubtedly, parents send their children to school to learn. In the school, children are exposed to various experiences which influence their behaviour. Therefore, learning is a change in behaviour. Such change is seen in their mental reasoning, physical growth, manipulative skills and development of values and interests. The change may be easy or difficult depending on the home and the school environment. Nevertheless, effective study habit among students seems to not have been observed overtime. This has prevailed despite efforts made by school administrators to provide study materials for students.

The idea of a planned programme of study which leads to strategies that motivate student's to explore, ask questions and solve problems that confront them [6]. Among the objectives of education is the clause; the need to help the individual to develop his/her full potentials. This cannot be achieved without proper planning, that is make students develop positive attitudes towards learning, which is one of the reasons for having a good study programme in the school environment. Unfortunately, the distressing phenomena of poor academic achievement, poor learning outcome and failure have caused serious concern to educationists, guidance counsellors and educational planners for several decades as this amount to massive wastage of resources available for education. Based on this unsatisfactory state of affairs, the present study will examine the effect of brainstorming techniques on secondary school students study habit.

Evidently, achievement is the end-product of all educational endeavours. The main concern of all

educational efforts is to see that the learner achieves. Unfortunately, the distressing phenomena, scholastic underachievement and failure have caused serious concern to educationists, guidance counsellors and educational planners for several decades as this amount to colossal wastage of resources available for education. Based on this background, the present study will examine the effects of brainstorming and encouraging techniques on secondary school students study habit in Anambra and Enugu states. The general purpose of this study is to determine the effect of brainstorming techniques on secondary students study habit in Anambra and Enugu states. Specifically, the study determined the effect of brainstorming technique on secondary school students study habit, and the difference in the effect of the treatment technique (brainstorming technique) on male and female secondary school students study habit. More so, the following questions were raised; what is the effect of brainstorming technique on students study habit?; what is the difference in the effect of the treatment technique (brainstorming technique) on male and female secondary school students study habit? The following null hypotheses were tested at 0.05 level of significance. The difference in the mean post-test scores of students who received treatment using brainstorming technique and those in the control group is not statistically significant. The difference in the mean post test scores of male and female secondary school students who received treatment using brainstorming technique is not statistically significant.

2. METHODOLOGY

This study on effect of brainstorming technique on secondary school students study habit adopted the quasi-experimental research design, more specifically the non-randomized pre-test – post test control group design. According to Azuji et al. [12], quasi experimental study is a type of experimental study that determines the effect of a treatment paradigm on a non-randomized sample.

The study was carried out among secondary school II students in South-east geographical zone, Nigeria. The population for this study comprised of 146,124 senior secondary school two students (58,155 male and 87,969 female) drawn from Anambra and Enugu states. The sample drawn for the study comprises 800 senior secondary school II students (350 male and 450

female). This sample was drawn using the simple random sampling technique of the use of table of random digits. In this method, the students were assigned numbers according to the position of their desk in the classroom. Based on the number of students, the researcher selects the 1st and at every 6th interval another student was picked. This selection was guided by the table of random digits. In assigning the students into the treatment and control groups, intact classes of the students was used. The instrument for data collection was a 24 item Study Habit Inventory Questionnaire (SHIQ) with a reliability index of 0.897. The instrument was subjected to validity by three validates in the Department of Guidance and Counselling, and Department of Measurement and Evaluation.

Table 1. Symbolic representation for the non-randomized pre-test and post test control group design

Experimental (Brainstorming technique) group	O ₁	X	O ₂
Control group	O ₁	-X	O ₂

Where: O₁ stands for pretest administered to all the students

X stands for treatment

-X stands for no treatment

O₂ stands for post test administered to both treatment and control groups

2.1 Training and Training Procedure

The researcher obtained the consent of the school principals for carrying on with the research. The training took place at the schools randomly selected by the researcher. On training days, the participants stayed in a conducive classroom within the school building. The training programme held for twelve sessions of treatment and 5 sessions of neutral interactions for six weeks. The senior secondary school II students (SS2) who participated in the study formed groups in their respective schools. Each of the schools with the highest number of students constituted a group; one experimental group and one control group. The participants in the experimental groups were exposed to brainstorming technique. They participated in eighteen one-hour sessions which were held thrice a week, for six consecutive weeks.

After six weeks treatment and neutral interaction, the Study Habit Inventory Questionnaire (SHIQ) was re-administered on all the participants in both the experimental and control groups, and was regarded as the post-test. The post-test was

collated and given to the researcher for analysis. The researcher determined the statistical difference between the experimental and control group scaled scores.

2.2 Control of Extraneous Variables

The researcher was very much aware of the possible effect of extraneous variables (gender, participant's mood, location, discrimination, method, and time of the day) which if appropriately controlled could have conformed the study and possibly distort the findings. The researcher therefore adopted some measures to minimize and possibly control the distorting effects of such variables.

2.3 Application of the Experimental Treatments

The sample for the study was broken into two groups (experimental groups and control group). Experimental group was treated with the brainstorming technique. The control group received no treatment, but rather a neutral interaction with the school guidance counsellor.

2.4 Experimental Bias

The researcher was aware of possible bias on the experimental group as against the control group which may negatively affect the study. To control this, while the experimental group was exposed to treatment packages, the control group was exposed to group neutral interaction sessions with the counsellor. The treatment sessions were administered by the same researcher. Also, both the Experimental and Control groups took part in the same pre-test and post-test exercises.

2.5 Hawthorne Effect

The Hawthorne effect as an experimenter effect whereby participants, in the study may exhibit a typically high levels of performance simply because they are aware that they are being studied, and hence changes in participants' behaviour during the course of a study may be related only to the special social situation, and social treatment they received. The researcher therefore put measures to avoid this. This was done by selecting different schools for the study like the schools presently being used by the researcher, ensuring that all emphasis was focused on the variables of study alone, all the participants in the treatment group and those in

the control group received the same encouragement gift of a pen, making sure that the students who participated in the pre-test, experimental group training and control group neutral interaction sessions are the ones that participated in the post-test; both the experimental and control group participants were treated equally, and the testing conditions were the same, except that the contents of the treatment packages differed as regards experimental group and control group was exposed to neutral interaction.

2.6 Use of Analysis of Covariance (ANCOVA)

Some extraneous variables may have remained uncontrolled, in spite of the preventive measures that the researcher adopted. Such possible leakages were taken care of through careful application of the Analysis of Covariance (ANCOVA) in data analysis, thereby isolating the possible distorting of variables as covariates. The completed instrument were scored following the scoring instructions which is the five point rating scale of strongly agreed = 5, agreed = 4, disagree = 3, strongly disagree = 2 and undecided = 1. Data relating to the research questions were analyzed using mean and standard deviation, while Analysis of Covariance (ANCOVA) was used to test the null hypothesis postulated.

3. RESULTS

Research Question 1: What is the effect of brainstorming technique on secondary school students study habit?

Data presented in Table 2 revealed the effect of brainstorming technique on secondary school students study habit, the results showed a pre-test mean score of 21.45 for the treatment group and 33.13 for the control group. The results further showed a post-test score of 75.85 for the treatment group and 41.26 for the control group. With a mean gain of 38.13 for the students in the control group, it reveals that brainstorming technique was more effective.

Research Question 2: What is the difference in the effect of the treatment technique (brainstorming technique) on male and female secondary school students study habit?

Data presented in Table 3 shows a mean gain of 12.89 and 17.50 for male and female students exposed to the brain storming technique. The

results showed a mean difference of 4.61, this shows that the effect of brainstorming technique on secondary school students differs in terms of gender.

3.1 Hypothesis Testing

3.1.1 Hypothesis 1

The difference in the mean post-test scores of students who received treatment using brainstorming technique and those in the control group is not statistically significant.

From the analysis presented in Table 4, the p-value (0.416) is greater than the alpha value

(0.05). This implies there was a significant difference in the mean post test scores of students who received treatment using brainstorming technique and those in the control group. Hence the null hypothesis is not rejected at 0.05.

3.1.2 Hypothesis 2

The difference in the mean post test scores of male and female secondary school students who received treatment using brainstorming technique is not statistically significant.

Data presented on Table 5 reveals that p-value ($p = 0.026$) is lesser than the alpha value (0.05).

Table 2. The effect of brainstorming technique on secondary school students study habit using their pretest and posttest scores

	N	SD	Pre-test mean	Post-test mean	Gained mean	Remark
Treatment (Brainstorming technique)	400	7.09	21.45	75.85	44.40	More effective
Control	400	6.25	33.13	41.26	38.13	

Table 3. Difference in the effect of the treatment technique (brainstorming technique) on male and female secondary school students study habit

Gender	N	Pre-test mean	Post test mean	Mean gain
Male	350	51.79	50.43	12.89
Female	450	48.03	36.64	17.50
Difference in the mean gain				4.61

Table 4. ANCOVA for difference in the mean scores of students who received treatment with brainstorming technique and those in the control group

Source of variation	Type III sum of squares	df	Mean squares	F	p-value
Corrected model	887.654 ^a	4	121.431	6.667	.000
Intercept	102.504	1	102.504	9.345	.008
Pre-test scores	946.939	1	946.939	31.436	.000
Treatment	4.822	1	4.822	.432	.568
Error	41.915	67	19.286	1.999	.341
Total	18001.011	69		.549	.416
Corrected total	1505.553	68			

Table 5. ANCOVA difference in the mean post test scores of male and female secondary school students who received treatment using brainstorming technique

Source of variation	Type III sum of squares	df	Mean squares	F	p-value
Corrected model	191.654 ^a	4	.486	0.14	.026
Intercept	711.504	1	41291.558	1199.512	.000
Pre-test scores	14.939	1	.486	0.14	.026
Gender	94.822	1	34.424		
Error	1851.915	67			
Total	18001.011	69			
Corrected total	1505.553	68			

This implies that the difference in the post test scores of male and female secondary school students who received treatment using brainstorming technique is significant with respect to gender. Hence the null hypothesis is rejected.

4. DISCUSSION

The findings of this study revealed that brainstorming technique is more effective in improving study habit among secondary school students in Anambra and Enugu states. Furthermore, the findings revealed a statistically significant difference in the mean post test scores of students who received treatment using brainstorming technique and those in the control group. This aligns with the studies of Adeyemi and Ajibade [3] which revealed a significant main effect of the treatment on students' achievement.

The result from the data analyzed further revealed that there exists difference in the mean gain scores with respect to gender. This could be likened to the study habit of male and female students, in which often time female students are said to study more than their male counterparts and vice versa. On the other hand, the hypothesis analysis revealed a significant difference in the post test scores of male and female students on the effect of brainstorming technique on study habit. This finding conforms to the finding of Mutua (2014) which revealed that there was significant difference between the mean performances of male and female students taught business studies using cooperative learning than those using lecture strategies. The findings is also in agreement with the findings of Al-Shammari [2] which showed that brainstorming instructional technique has shown to improve students' achievement in diverse fields of human endeavour.

5. CONCLUSION

This paper provided insight on the effect of brainstorming technique on secondary students study habit in Anambra and Enugu states. From the analysis carried out, the findings revealed a significant difference in the effect of brainstorming technique on students study habit with respect to gender. Finally, the study concluded that brainstorming technique is effective for improving secondary school students study habit, and a significant difference in the mean post test scores of secondary school

students. Based on the findings of this study, it was recommended that counsellors should adopt effective techniques such as brainstorming techniques to improve students study habit and enhance their learning outcome. It was also recommended that state and federal government should compulsorily seek that all secondary schools have at least one practicing counsellors within the school.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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