Universe International Journal of Interdisciplinary Research
(Peer Reviewed Refereed Journal)

© UIJIR | ISSN (O) – 2582-6417
NOV 2020 | Vol. 1 Issue 6
www.uijir.com

EFFECT OF BRAIN-BASED TEACHING APPROACH ON THE ACADEMIC ACHIEVEMENT AMONG SECONDARY SCHOOL STUDENTS

Author's Name: Rajkumari Gunisana Devi

Affiliation: *Associate Professor, Department of Community Health Nursing, Govt. College of Nursing, Safidon, Jind, Haryana, India*

E-Mail: gunisana@gmail.com

DOI No. – 08.2020-25662434

Abstract

Brain based teaching is designed to help the teachers recognize that teaching could be made fascinating to students by introducing innovative methods of teaching. This approach of teaching provides meaningful learning when the teacher understands how the brain learns naturally. The research approach adopted in the present study was evaluative approach, and research design was quasi-experimental pre-test post-test control group research design. Purposive sampling technique was used to select the sample for the study. The sample size was of 60 students of secondary school. Data were collected by using structured knowledge questionnaire schedule through multiple choice questions. Analysis of the data was done using descriptive statistics as mean, standard deviation and inferential statistics as Chi- square test. In experimental group overall mean pre-test academic score of study respondents was 11.50 (S.D=1.90) and 19.26 (S.D=1.94) was the mean post-test academic score. In the control group the overall mean pre-test academic score of students was 11.26 (S.D=1.98) and 14.22 (S.D=2.22) was the mean post-test academic score. . It is evident from the above table values that the overall academic mean post test score was higher than the mean pre-test academic score. In experimental group mean difference of (7.76), S.D = 2.96 of overall academic performance with paired' value (16.65). In the control group the mean difference of (2.96), S.D = 0.24 of overall academic performance of the students with paired' value (13.82). There was no significant association between the demographic variables such as age, gender, religion, residential areas, type of the family and family monthly income of academic performance of the students in the experimental and the control group

Keywords: *Brain based teaching method, academic performance, secondary student*

INTRODUCTION

Brain based teaching approach is an approach where the principles and theory of brain based learning is followed. BBTA provides a meaningful learning by accepting the rules of how brain processes and organizes the instruction according to these rules of mind (Caine & Caine, 1994). According to Caine & Caine meaningful learning occurs only when brain works in a unity while learning. Therefore Caine stresses the teachers to teach the students by due consideration to brain.[1] As BBTA is taught according to the principles and working of brain it is proved to be the best way of learning and boosting of academic performance by the findings under this area of research.[2]

Brain based teaching is a new methodology originated from brain based learning. This new discipline of learning is the result of various researches conducted by neuroscientists which is now entitled as educational neuroscience (Wilson, 2001). Educational neuroscience is an emerging field of science that transports the researchers in cognitive neuroscience, educational

psychology, educational technology, and other related disciplines to explore the interaction between biological process and education.[3]

It enhances learning by understanding the mental process of learning. The blend of education and neuroscience has paved the way to challenging approaches of innovative teaching and learning. Brain based teaching is one such educational pedagogy that integrates neuroscience concepts in its syllabi and practices. [4]

In normal method of teaching students sit frivolously in their classroom listening to the lecture given by the teacher. The lecturing is followed by the note taking from the blackboard. The notes of the concerned topic is then memorized by the students those who are good in it. Students are trained to be exam oriented. Information they gain from the school will not be retained for a long period as the context was taught in the typical traditional methodology.[5] Students' emotions like threat, boredom, stress, are not considered by the teacher. No activities are done to stimulate the brain. This type of learning affects the slow learners with poor academic performance. In order to overcome the situation, brain based teaching approach provides better platform for students to learn and understand the concept in a different method.[6]

Brain-based learning focuses on how we learn with the help of brain. It embraces accepting the rules of brain processing, and structuring the teaching according to these rules for meaningful learning. It provides us to think at the stage of making decision. When usual classroom teaching methodologies designed with homogenous learning style, brain-based teaching approach takes a holistic approach, where its principles and techniques are blended in teaching-learning process to make the learning meaningful with equal participation of the students. Thereby the students are free from the daily lecturing classes.[7]

The purpose of the present study is to determine the impact of teaching process based on the techniques of brain-based learning with usual classroom teaching. The investigator is also intended to find out whether BBTA makes similar contribution to academic achievement of students. Researchers have introduced this new paradigm of teaching, brain-based techniques in their classrooms, where they witnessed higher degree of progress in the academic achievement of students in various subjects.[8]

The study is designed to help the teachers recognize that teaching could be made fascinating to students by introducing innovative methods of teaching. Brain based teaching approach is one such method of teaching.[9] This approach of teaching provides meaningful learning when the teacher understands how the brain learns naturally. In the study the investigator develops a brain based teaching model which will certainly help the students to clench the content matter easier than the normal method of teaching. Students don't have to sit indolently and listen to the lecture in brain based classroom. As the emotions of the students are given owed consideration, boredom threat and stress will be reduced which will result to a better academic performance.[10]

OBJECTIVES OF THE STUDY

1. To assess pre-test knowledge regarding academic achievement among Secondary School Students in the control group and experimental group.
2. To develop and administer brain based teaching method regarding academic achievement among Secondary School Students in the experimental group and usual teaching method in the control group

3. To assess post-test knowledge regarding academic achievement among Secondary School Students in the control group and experimental group.
4. To compare the pre-test & post-test knowledge regarding academic achievement among Secondary School Students in the control group and experimental group.
5. To find out association between post-test knowledge regarding academic achievement among Secondary School Students in the control group and experimental group with their demographic variables.

OPERATIONAL DEFINITION

- **Brain-based teaching method (BBTM):** The brain-based teaching approach is a teaching technique followed in the classroom by using the principles of brain-based learning and also the three fundamental elements namely relaxed alertness, orchestrated immersion, and active processing.
- **Effect: -** In this study it refers to the effectiveness of brain based teaching approach in improving the academic achievement of students.
- **Academic achievement: -** Academic achievement refers to the extent to which a student has achieved his/her educational goals. In the present study, the marks obtained by the students through a test developed by the researcher related to the content selected from Second Language English is considered as academic achievement.
- **Students: -** Students in the present study refer to students who are studying in secondary schools.

HYPOTHESIS

H1: Experimental group students exposed to BBTM scores high in the post achievement test than the students of control group.

H2: There will be association between the post-test knowledge score regarding academic achievement among Secondary School Students with their selected socio-demographic variables.

ASSUMPTIONS

- The student's knowledge regarding academic achievement will be less before brain based teaching method.
- The students are willing to participate in the study.
- Brain based teaching method will be effective method for imparting knowledge in the students.

DELIMITATIONS

- Students who were present during the time of data collection.
- The study limited to 60 secondary school students
- Students who were willingly participated in the study.

Therefore, the investigator felt that brain-based learning provide a favorable environment for fruitful learning which results in the boosting of academic achievement of students. It is also observed that the new teaching approach not only enhance students' learning but also it overcomes the limitation caused by traditional teaching method.

© UIJIR | ISSN (O) – 2582-6417
NOV 2020 | Vol. 1 Issue 6
www.uijir.com

MATERIALS AND METHODS

- **Research Approach:-** The research approach adopted in the present study was evaluative approach. This study includes manipulation, control and no randomization.
- **Research design:-** Research design was quasi-experimental pre test post test control group.

  Experimental Group O1 ------ X ------ O2
  Control Group O1 ------ X1 ------ O2

  Keys:-
  O1 – pretest on academic achievement
  O2 – posttest on academic achievement
  X -- Brain based teaching method
  X1 -- Usual teaching method

VARIABLES

- **Independent variable**: - An independent variable in the variable that stands alive is not dependent on any other. In this study independent variable refers to brain based teaching programme for experimental group and usual teaching method for control group.
- **Dependent variable**: - The variable that is hypothesized to depend on or caused by another variable, the independent variable. In this study, the academic achievements of the student are the dependent variables.
- **Extraneous variable**:-The extraneous variable under the study are age, gender, religion, education, residential areas, type of family and monthly family income.
- **Sample size:** - Sample comprised of 60 students who were studying in selected secondary schools, sohana, 30 experimental group and 30 control group.
- **Sampling technique** Non-probability purposive sampling technique was used to select the sample for this study. The researcher selected the subjects purposively for both control and experimental group from selected secondary schools.
- **Description of Tool:-**
  Part I – Demographic Performa: - A proforma for selected personal information was used to collect the sample characteristics. The characteristics included age, gender, religion, education, residential areas, type of family and monthly family income.

PART II: STRUCTURED KNOWLEDGE QUESTIONNAIRE

It consisted of 25 items. All the items were multiple choice questions, which had 4 alternative responses. A score value of 1 was allotted to each correct response and for wrong response zero was awarded. Thus there were 25 maximum obtainable scores. The level of knowledge was categorized based on the percentage of scores obtained.

KNOWLEGE LEVEL	PERCENT	RANGE OF SCORE
Low knowledge	: Below 50%	1-13
Average knowledge	: 51% - 75%	14-19
High knowledge	: Above 75%	20-25

- **Reliability of the tool: -** Reliability of the tool was determined by the test retest method. And "r" value is obtained (r^1 =0.92). It shows that the tool was highly reliable for the ultimate study.
- **Data collection procedure: -** The investigator established good support with the students who were studying n selected school, sohana and took consent from each student to participate in this study. And collected socio demographic data from the student from both experimental and control group by using close ended questionnaire and again after a gap of seven days post test was conducted with the same tool. Data was collected and observed for 60 students, out of which 30 were in the experimental group and 30 were in control group.
- **Plan of data analysis: -** The plan of data analysis includes both descriptive and inferential statistics. The collected data was organized, tabulated and analyzed based on the objectives of the study by using descriptive statistics i.e. percentage, mean and standard deviation and inferential statistics i.e., chi-squares'' test and correlation co-efficient.

RESULTS

Table – 1: Distribution of students according to socio demographic variables by frequency and percentage **N=60**

Demographic variables		Group			
		Experimental		Control	
		f	%	f	%
Age(years)	13	06	20.00	08	26.66
	14	18	60.00	16	53.33
	15	06	20.00	06	20.00
Gender	Male	12	40.00	10	33.33
	Female	18	60.00	20	66.66
Religion	Hindu	08	26.66	10	33.33
	Muslim	02	06.66	00	00
	Sikhism	18	60.00	19	63.33
	Christian	02	06.66	01	03.33
Residential area	Rural	22	73.33	18	60.00
	Urban	08	26.66	12	40.00
Type of family	Nuclear	10	33.33	12	40.00
	Joint	16	53.33	16	53.33
	Extended	04	13.33	02	06.66
Monthly family income	1000 - 5000	06	20.00	05	16.66
	5001 - 10000	15	50.00	14	46.66
	10001 - 15000	7	23.33	06	20.00
	15001 & Above	2	06.66	5	16.66

- According to the age 20% were distributed in the 13 Years, 60% were distributed in the 14 years and 20% were distributed 15 yrs in the experimental group.
- According to the age 26.33% were distributed in the 13 Years, 53.33% were distributed in the 14 years and 20% were distributed 15 yrs in the control group.
- According to the gender, 40.00% of the sample is found to be males and females are 60.00% in the experimental group.
- According to the gender, 33.33% of the sample is found to be males and females are 66.66% in the control group.
- According to the religion, 26.66% were distributed in the Hindu, 06.66% were distributed in the Muslims, 60.00% were distributed in the Sikhism and 06.66% were in the Christian in the experimental group.

- According to the religion, 33.33% were distributed in the Hindu, 00 % was distributed in the Muslims, 63.33% were distributed in the Sikhism and 03.33% were in the Christian in the control group.
- According to residential area, 73.33% were residing in rural area and 26.66% were residing in urban area in the experimental group.
- According to residential area, 60.00% were residing in rural area and 40.00% were residing in urban area in the control group.
- According to type of family, 33.33% of the students have nuclear family, 53.33% have joint family and the 13.33% have extended family in the experimental group.
- According to type of family, 40.00% of the students have nuclear family, 53.33% have joint family and the 06.66% have extended family in the control group.
- According to monthly family income, 20.00% students have of Rs 1000 - 5,000/- , 50.00% have of Rs 5001-10000/-, 23.33% have of Rs 10001 - 15000/- and 06.66% have of Rs 15,001 and above in the experimental group.
- According to monthly family income, 16.66% students have of Rs 1000 - 5,000/- , 46.66% have of Rs 5001-10000/-, 20.00% have of Rs 10001 - 15000/- and 16.66% have of Rs 15,001 and above in the control group.

TABLE – 2: Pre-test and post test score of academic performance of the Students in experimental group and control group **N=60**

Academic performance of the students	Group			
	Experimental		Control	
	Mean	SD	Mean	SD
Pre test	11.50	1.90	11.26	1.98
Post test	19.26	2.94	14.22	2.22

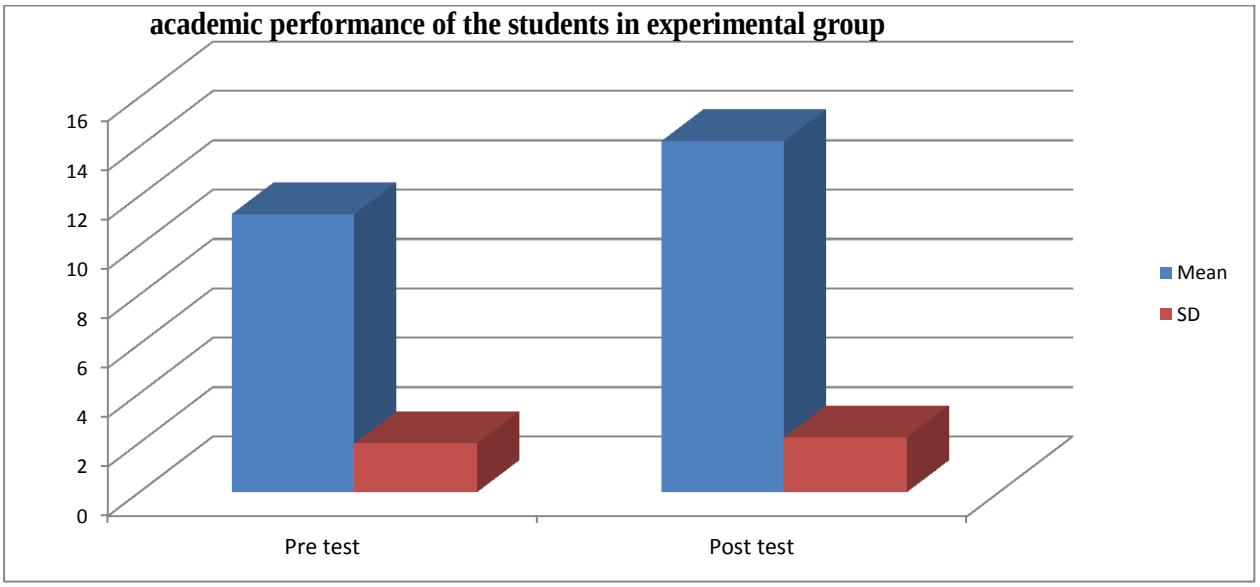

Table 2 describes that in experimental group overall mean pre-test academic score of study respondents was 11.50 (S.D=1.90) and 19.26 (S.D=1.94) was the mean post test academic score. It is evident from the above table values that the overall academic mean post test score was higher than the mean pre-test knowledge score.

In the control group the overall mean pre-test academic score of students was 11.26 (S.D=1.98) and 14.22 (S.D=2.22) was the mean post test academic score. It is evident from the above table

values that the overall knowledge mean post test score was higher than the mean pre-test knowledge score.

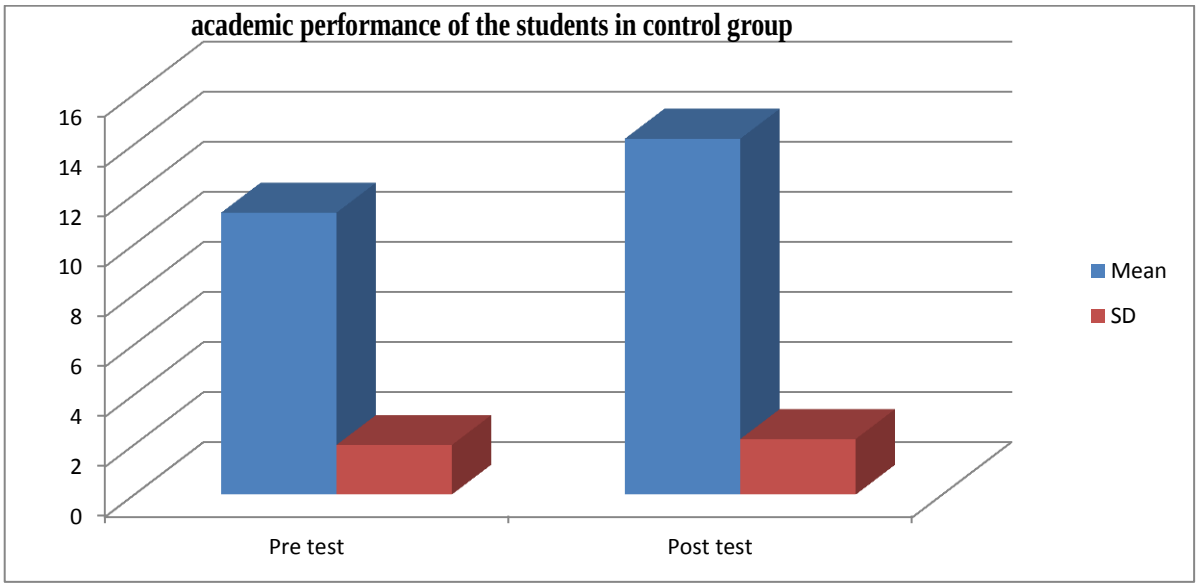

TABLE – 3: Comparison of pre-test and post test score of academic performance of the students in experimental group and control group N=60

Academic performance of the students	Mean diff	SD Difference	SE differe	Paired t test
Experimental	7.76	1.04	0.46	16.65
Control	2.96	0.24	0.58	13.82

Table 3 describe that in experimental group mean difference of (7.76), S.D = 2.96 of overall academic performance with paired' value (16.65). Thus it reveals that the mean post test knowledge scores was significantly higher than the mean pre test knowledge scores of students of experimental group ='t' = (16.65), $p<0.05$. It shows that there is a significant difference between pre test and post test academic performance scores of the students.

In the control group the mean difference of (2.96), S.D = 0.24 of overall academic performance of the students with paired' value (13.82). Thus it reveals that the mean post test knowledge scores was significantly higher than the mean pre test knowledge scores of the students of control group='t' = 13.82, $p<0.05$. Thus the research hypothesis (H_1) was accepted. It shows there is a significant difference between pre test and post test academic performance scores of the students.

The comparison between experimental group and the control group is that in experimental group, the brain based teaching method is more effective than the usual teaching method in the control group because the difference between the mean difference in the experimental group is 7.76 and the control group the mean difference 2.96. so experimental group students achieve more academic performance than the control group students. So the research hypothesis H1 is accepted.

TABLE -4: Association between socio demographic variables of students with their post test academic scores in experimental group and control group N=60

Sl. No.	Variables	χ^2 value in experimental	χ^2 value in experimental	Association	Degree of freedom	χ^2Table value at 5% level of

		group	group			significance
1	Age	1.07	0.21	NS	1	3.84
2	Gender	2.4	0.36	NS	1	3.84
3	Religion	0.067	0.45	NS	1	3.84
4	Residential area	0.093	1.43	NS	1	3.84
5	Type of the family	0.070	0.36	NS	1	3.84
6	Family monthly income	0.485	0.33	NS	1	3.84

NS- NOT SIGNIFICANT

Table 4 describes the association between socio demographic variables and post test academic scores of students in the experimental group. The chi-square values for age (χ^2 = 1.07), gender (χ^2 = 2.4), religion (χ^2 = 0.067), residential area (χ^2 = 0.093) , type of the family (χ^2 = 0.070) and family monthly income (χ^2 = 0.485) were found to be less than Table χ^2value (3.84).

In the control group the association between socio demographic variables and post test academic score of the students. The chi-square values for age (χ^2 = 0.21), gender (χ^2 = 0.36), religion (χ^2 = 0.45), residential area (χ^2 = 1.43), type of the family (χ^2 = 0.36) and family monthly income (χ^2 = 0.33) were found to be less than Table χ^2value (3.84).

Hence there was no significant association between the demographic variables such as age, gender, religion, residential areas, type of the family and family monthly income of academic performance of the students in the experimental and also control group. Hence the hypothesis (H2) has been rejected.

DISSCUSSION

In experimental group overall mean pre-test academic score of study respondents was 11.50 (S.D=1.90) and 19.26 (S.D=1.94) was the mean post test academic score. It is evident from the above table values that the overall academic mean post test score was higher than the mean pre-test academic score.

In the control group the overall mean pre-test academic score of students was 11.26 (S.D=1.98) and 14.22 (S.D=2.22) was the mean post test academic score. It is evident from the above table values that the overall academic mean post test score was higher than the mean pre-test academic score.

In experimental group mean difference of (7.76), S.D = 2.96 of overall academic performance with paired' value (16.65). Thus it reveals that the mean post test knowledge scores was significantly higher than the mean pre test knowledge scores of students of experimental group ='t' = (16.65), $p<0.05$.

In the control group the mean difference of (2.96), S.D = 0.24 of overall academic performance of the students with paired' value (13.82). Thus it reveals that the mean post test knowledge scores was significantly higher than the mean pre test knowledge scores of the students of control group='t' = 13.82, $p<0.05$.

There was no significant association between the demographic variables such as age, gender, religion, residential areas, type of the family and family monthly income of academic performance of the students in the experimental and the control group. Hence the hypothesis (H2) has been rejected.

CONCLUSION

In experimental group overall mean pre-test academic score of study respondents was 11.50 (S.D=1.90) and 19.26 (S.D=1.94) was the mean post test academic score. In the control group the overall mean pre-test academic score of students was 11.26 (S.D=1.98) and 14.22 (S.D=2.22) was

the mean post test academic score. . It is evident from the above table values that the overall academic mean post test score was higher than the mean pre-test academic score.

In experimental group mean difference of (7.76), S.D = 2.96 of overall academic performance with paired' value (16.65). In the control group the mean difference of (2.96), S.D = 0.24 of overall academic performance of the students with paired' value (13.82). The comparison between experimental group and the control group is that in experimental group, the brain based teaching method is more effective than the usual teaching method in the control group because the difference between the mean difference in the experimental group is 7.76 and the control group the mean difference 2.96. so experimental group students achieve more academic performance than the control group students. So the research hypothesis H1 is accepted.

There was no significant association between the demographic variables such as age, gender, religion, residential areas, type of the family and family monthly income of academic performance of the students in the experimental and the control group. Hence the hypothesis (H2) has been rejected.

ACKNOWLEDGMENTS

We would like to thank the investigator, and study participants of this study.

REFERENCES

1. Olaoluwa SA, Ayantoye CA. Impact of brain-based instructional strategy on academic performance of deaf students in mathematics in Oyo School of Handicapped, Nigeria. World Journal of Educational Research. 2016; 3(2):447-459.
2. Jensen EP. Brain-based learning: The new paradigm of teaching (2th ed). San Diego, CA: Corwin Press; 2008.
3. Duman B. The effects of brain-based learning on the academic achievement of students with different learning styles educational sciences. Theory & Practice. 2010; 10(4):2077-2103.
4. Umoru SE. Effect of brain-based learning approach on senior secondary school students achievements in genetics in Markurdi metropolis. Journal of Science Education, Faculty of Education Taraba State University, Jalingo. 2016; 1(1):65-72.
5. Zadina JN. Brain research-based effective strategies to enhance learning and energize instruction. Paper presented at the meeting of the U.S. Department of Education Office of English Language Acquisition Summit Conference. U.S.A; 2004.
6. Caulfield J, Kidd S, Kocher T. Brain-based instruction in action. Educational Leadership. 2000; 58(3):62-65.
7. Akyurek, E. Effects of brain-based learning approach on students' motivation and attitude levels in Science class. Mevlana International Journal of Education,2013, 3(1), 104-119. Retrieved from http://mije.mevlana.edu
8. Aziz-Ur-Rehman, &. B. Effectiveness of brain based learning theory at secondary level. International Journal of Academic Research, 2011 3(4), 354-359.
9. Becktold, T. H. Brain based instruction in correctional settings: Strategies for teachers. *JCE*, 2001 *52*(3), 95-97.
10. Jack GU, Kyado JJ. Effectiveness of Branbased learning achievement, attitude, motivation and knowledge retention in electrochemistry. Journal of Education, Society and Behavioural Science. 2017; 21(3):1-13.

© UIJIR | ISSN (O) – 2582-6417
NOV 2020 | Vol. 1 Issue 6
www.uijir.com