Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
May 2024 5(5), 575–580

EFFECT OF BRAIN BASED LEARNING STRATEGIES ON CREATIVE THINKING OF MIDDLE LEVEL STUDENTS

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DOI
10.29121/shodhkosh.v5.i5.2024.2041

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

In the present research study, to examine the effect of brain-based learning strategies on creative thinking of class VIIth science students. The researcher has used experimental research method and pre-test post-test two group design for her research. The research study was conducted on a sample of 60 students of class VIIth of S.D. Inter College, Agra city (U.P) which is selected by purposive sampling method. The students were randomly divided into two groups experimental and control groups by simple random sampling method. The experimental group was taught through brain-based learning strategies while the control group was taught through traditional method. For Statistical analysis researcher has been used mean, median, t-test. The findings of the research revealed that the students of the experimental group performed better for creative thinking, while the students of the control group performed very low for creative thinking. Brain-based learning strategies are an effective method of teaching in science for middle level students.

Keywords: Brain Based Learning Strategies, Pedagogy of Science, Creative Thinking

1. INTRODUCTION

All living humans are profoundly intelligent as they are endowed with a unique set of sensory apparatus. Hence every living human is designed to study, experience and develop himself in his environment. School education has undergone a radical change over time. The traditional education system has been in practice for thousands of years which have undergone many changes continuously to keep the learning process simple, easy, effective, efficient and productive as the educational process is a very important link between man and his society.The National Education Policy (2020) proposes to provide quality education opportunities to students to secure the future of the country. It is believed that science and creative thinking will be very important for the future of India and India's leadership role in many upcoming sectors and businesses including artificial intelligence, machine learning and data science etc. As per the NEP (2020), at all stages, experiential learning will be adopted, which will include practical learning, collaborative learning, group discussions, constructivist approach, arts-integrated and sports-integrated learning, pedagogy based on story-telling, among other things, as standard pedagogy within each subject and exploring connections between different subjects.

NCFSE (2023).The brain plays a vital role in learning. The brain is a complex organ made up of neurons, glial cells, blood vessels, and many cells that are organized in specialized regions.

2. CREATIVE THINKING

Creativity is found in more or less degree in every living being. Development and progress in different spheres of life are the results of creativity. According to NCFSE(2023), the middle level often exhibits the most intense learning possibilities - individual learning ability and individual creativity become clearly visible in a form different from others. According to NEP (2020), creativity plays an important role in making logical decisions and encouraging innovation. According to Levin (1978), creative thinking is a special form of thinking, a way of looking at the world and interacting with it in ways different from the general population. Humans are endowed with certain powers by nature from birth. The most prominent of these powers is creativity. In simple terms, the ability to do something meaningful, new and unique is creativity, but it will prove useful only when the quality of utility is present in this unique thinking, which proves useful for the society.

3. BRAIN-BASED LEARNING

Brain-based learning has been described as a blend of science and common sense. Leslie Hart (1983) argues that teaching without an awareness of how the brain learns is like designing a glove with no knowledge of what a hand looks like. If classrooms are to be viewed as 'places of learning', then the brain as the 'organ of learning' must be understood and accommodated. From this perspective, the brain will be increasingly relevant to thinking about educational practices. Because of this, continued efforts have led to brain-based learning. Pedagogy which is the study of the art and science of teaching and neuroscience which is the study of the development, structure and function of the brain. Neurologists and educationists came together as educational neuroscience to make learning processes effective by integrating neuroscience and education (Wolfe, 2001; Doyon & Benali, 2005; Posner & Rothbart, 2023). Neuro-educationalists have used brain findings to extend the field of learning (Ozden et al., 2008; Pacheco & Oliveira, 2023). Another theory is from Cain and Cain (1994), who continued studies on the brain and learning, examining brain functions during learning and proposed 12 brain/mind learning principles. The Dutch Science Council (2010) established the Brain and Learning Committee to make this an integral part of their education policy.

4. OBJECTIVE

1.To study the effect of Brain-Based learning Strategies on Creative Thinking of middle level students.

5. HYPOTHESIS

Ha1: There will be a significant effect of Brain-Based learning Strategies on Creative Thinking of middle level students.

6. RESEARCH METHODOLOGY AND DESIGN

The researcher has adopted Experimental method and pre-test post-test two group design was used in the study.

Figure 1 Research Design

Experimental Group	T (Pre-Test)	X1 (Treatment through BBLS)	T (Post-Test)
Control Group	T (Pre-Test)	X1 (Treatment through Traditional Method)	T (Post-Test)

SAMPLING TECHNIQUE

Sample of 60 students of middle level students class VIIth was selected from the population of U.P. Board, Agra (U.P).The school S.D. Inter College, Agra was selected by purposive sampling method. Then selected 60 students of class VIIth by random sampling method and the 60 students divide in to two groups by random sampling method.

TOOLS USED

The researcher used tool for data collection –

FOR CREATIVE THINKING- Baqer Mehdi's Creative Thinking Test was given in 1985 which has been reviewed in 2019. The number of items in this test is 10. This tool has been standardized for class VIIth students. In the present research, class VIIth students have been selected as the sample, so the researcher chose Baqer Mehdi's Creative Thinking Verbal Test (reviewed in 2019)

7. PROCEDURE OF THE STUDY

Eight lessons from NCERT's science book classVIIth were selected by the researcher for the prepare of the lesson plan. Twenty lesson plans were based on the Brain based learning strategies and Twenty lesson plans were based on the traditional method. Both groups were taught by researcher. Brain based learning strategies like Cross lateral exercise, Concept mapping, Think-pair and share, Thematic instruction, Cooperative learning, Reflection Journal, Video were used for experiment group.

The whole intervention work was one month. At the beginning of the experiment, pre-test of creative thinking was taken both groups. After that, the intervention was done. The experimental group was taught based on brain-based learning strategies lesson plans and the control group was taught based on traditional learning strategies. And finally, the researcher was taken post-test of creative thinking in both groups.

Controlled variables- At the time of experiment some unrelated variables are present which can affect the results like- age, class, period of study, school variation, noise etc.

Table 1 Methods of controlling extraneous variables

Extraneous variables	**Methods of control**
Age	Stability
Class	Stability
Period of study	Stability
School variation	Selection
Teacher	Stability (Researcher)
Noise	Removal

DATA ANALYSIS

Before analysing and interpreting the data, it is necessary to determine the nature of distribution of the data whether the collected data are normally distributed or not. The researcher has used for check normality by Shapiro Wilk test .

Ha1: There will be a significant effect of Brain-Based learning Strategies on Creative thinking of middle level students.

- Testing the Normal Distribution Assumption of the Pre-Test Scores of the Verbal Test of Creative Thinking.

The researcher tested the assumption of normal distribution of the pre-test scores of both the groups before testing the significance of the difference between the means of the groups. Normal distribution was tested by SPSS 20 through the Shapiro-Wilk test.

Table 2 Descriptive Statistics and Shapiro Wilk test of Pre-test sores of Creative thinking

Pre-test	Shapiro Wilk test			Statistical value of skewness	z value of skewness	Statistical value of kurtosis	z value of kurtosis
Verbal test of creative thinking	Statistics Value	Degree of freedom Level of significance	Level of significance				
Experimental group (N=30)	.962	30	.559	-.32	-.74	.36	.46
Control group (N=30)	.958	30	.478	.132	.21	-.65	-.70

It is clear from Table 3 that the value of Shapiro Wilk test on the pre-test scores of the verbal test of creative thinking of the students of experimental group and control group is .559 and .478 respectively, which is more than the significant

value (.05) of Shapiro Wilk test.The z-values of skewness and kurtosis of the experimental group and control group are -.74, .21, .46, -.70 respectively, which is between -1.96 to +1.96. Hence, the distribution of data related to the verbal test of creative thinking in the pre-test is normal.

- **Comparison of the pre-test scores of creative thinking of students of experimental group and control group**

Table 3

Group	Number	Mean	Standard Deviation	Degree of Freedom	T-value	Level of Significance
Experimental Group	30	149.74	24.75	58	1.38	0.05
Control Group	30	147.66	17.17			

It is clear from table number 4 that the mean of the pre-test data of creative thinking of experimental and control group is 149.74 and 147.66 respectively and standard deviation is 24.75 and 17.17 respectively. The t-value of pre-test of creative thinking of experimental and control group is 1.38 which is less than the tabulation value of significance level 0.05(1.96). This shows that the creative thinking of the students of experimental and control group is the same i.e. experimental and control groups are homogenous before the experiment.

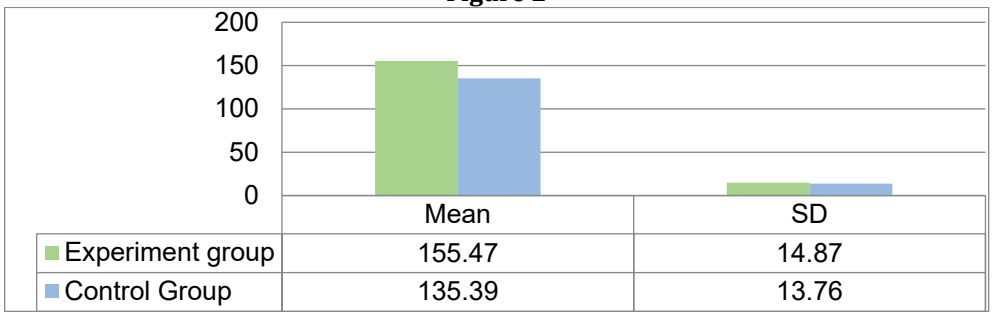
- **Comparison of post-test marks of creative thinking of students of experimental group and control group**

Table 4

Group	Number	Mean	Standard Deviation	Degree of Freedom	T-value	Level of Significance
Experimental Group	30	155.47	14.87	58	5.44	0.01
Control Group	30	135.39	13.76			

It is clear from Table No.5 that the mean of the post-test data of creative thinking of experimental and Control group is 155.47 and 135.39 respectively and the standard deviation is 14.87 and 13.76 respectively. The t-value of the post-test of creative thinking of experimental and control group is 5.44 which is more than the table value of significance level 0.01 (2.58). This shows that the creative thinking of the students of experimental and control group is not the same. By showing the mean and standard deviation of the post-test of creative thinking of the students through the following diagram, it has been made clear that the performance of the students of experimental group was almost good in the test.

Figure 2



After analysing the data, it was concluded that the teaching process based on brain-based learning strategies was more effective in positively enhancing the creative thinking of students than the teaching based on traditional methods.

8. FINDINGS, CONCLUSIONS AND SUGGESTIONS

After analysing the data, it is concluded that the teaching process based on brain-based learning strategies was more effective in enhancing the creative thinking of students than the teaching based on traditional method. The results of the current research study are also supported by the results of earlier research studies. The study of Harjono et al., (2022), Ramakrishna.(2016) and Suwistika et al., (2024), revealed that brain-based learning strategies have been helpful in enhancing the creative thinking and critical thinking skills of students.

Any research work is considered meaningful only when the utility of that research work is in the interest of the country and society. The present research study has studied the effect of brain-based learning strategies on creative thinking of

middle level students. This research study will be helpful in making the students of the 21st century active. In the National Education Policy (2020) and National Curriculum Framework (2023), it has been emphasized that instead of rote learning system and theoretical knowledge, students should focus on experiential and practical knowledge; the curriculum should be made flexible and interesting. The most benefit of this research study will be for students, teachers and the entire education world. Through this, interest and experiential approach towards science subject will develop in the students and it will be helpful in the development of creative thinking of the students.

CONFLICT OF INTERESTS

None

ACKNOWLEDGMENTS

None

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