

EFFECTIVENESS OF BRAIN COMPATIBLE LEARNING ON ACHIEVEMENT IN SOCIAL STUDIES AMONG HIGH SCHOOL STUDENTS

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Abstract:

Brain based learning is a learner centered approach based on the structure and function of the brain by which learning occurs more effective and long lasting. The conventional methods of teaching and learning followed in schools often hinder learning, through ignoring brain's normal learning development. As social studies is considered as a compulsory subject at secondary level, it should be studied in a more effective way than conventional method of learning. The present investigation aims to study the effectiveness of brain compatible learning on achievement in social studies among high school students by comparing the pre-test and post-test achievement scores of the experimental group and control group. The sample consisted of 89 students studying in standard IX under CBSE stream. The experimental group consisted of 44 students, treated with brain compatible learning method and the control group consisted of 45 students, treated with conventional method. Pre-test, Post-test non-equivalent parallel group experimental design was adopted for the study. The findings of the study revealed that brain compatible learning is superior to conventional method in learning social studies in terms of post-test achievement scores. Since there is a positive effect of brain-compatible learning on achievement in social studies of high school students, it seems to be an alternative tool for effective teaching learning process.

Key Words:

Brain Compatible Learning, Conventional method, Constructivism, Academic achievement, Social Studies, High school students, Effective teaching.

Introduction

Since the dawn of independence 'improving the quality of education 'is the pre-dominant and pressing challenge that the nation continues to face. The quality of education is only possible if the students remain active in classroom throughout the teaching learning process. Creating a stimulating learning environment will facilitate full development of intelligence and enhance the ability of learners to attain, retain and recall of information beyond the walls of classroom. Conventional method of teaching followed in schools often hinder

learning and through ignoring brain's normal learning development. It is typically characterized as didactic instruction in which information is presented to students to learn with little consideration of how that information is used. It does not provide active participation of students in teaching learning process and they usually memorize the subject matter without understanding its meaning. The teachers need to reinvent their teaching skills and schools need to move from traditional approach of teaching to teaching from context, utilizing the total capacity of brain. Teaching methodologies too need to be reviewed, as majority of the classrooms in the country continue to be dominated by teacher centered rote learning. Constructivism theory has emerged as an innovative approach in pedagogical science that helps to eliminate the limitations of conventional method of teaching learning process.

Brain Compatible Learning

Since learning is connected to the brain in some way, brain based learning is in accordance with the brain is naturally designed to learn. Brain based learning is a learner centered approach based on the structure and function of the brain by which learning occurs more effective and long lasting. Brain-Based learning refers to teaching methods, designing lessons and school programs on how the brain learns, including the factors as cognitive development. Brain compatible learning has been restored with a view of orchestrating teaching in accordance with how the human brain learns (Caine & Caine, 1994). According to Leslie Hart (1983) who coined the term *brain-compatible* stated that 'teaching without an awareness of how the brain learns is like designing a glove with no sense of what a hand looks like its shape, how it moves'. Brain based teaching strategies effectively created the learning success if the students which in turn created a positive student perception.

Need and Significance of the Study

Social studies teaching needs to be revitalized towards helping the learner acquire knowledge and skills in an interactive environment. The teaching method adopted by the teacher has a great effect on the student's interest, achievement and brain development. Effective learning is to a great extent depends on the way of teaching and over all atmosphere of learning. In the present scenario, transformation approach of learning has received considerable attention in the educational practice compared to that of transmission approach. The choice of suitable method adopted by a teacher depends on many factors such as learner, nature of subject, topic, facilities available and attitude of the teacher. Most of the students do not have the skills

necessary for creative and critical thinking, needed to thrive both within and beyond the classroom. In the class room thinking skill should be integrated with other instructional strategies such as such as graphic organizer and co-operative learning as they create a powerful synergy that is wholly brain compatible. Since learning is connected to the brain in some way, brain based learning is in accordance with the way the brain is naturally designed to learn. Understanding how the brain learns by actually capturing, sorting and holding on to information, enable teachers to implement the kind of information and develop the kinds of classroom that capitalize on the brain's natural abilities and thus promote students learning.

Brain-compatible learning is a way to provide relaxing environment for children to learn. It creates an environment where the students can use their whole brain, yet by using the right and left brain, learning model, educators can understand each student's different learning styles. Above all it provides a large variety of learning environment by that the brain constantly stimulated which enriches the brain and promotes brain growth.

Inspite of the great significance of this area, it has been neglected till recently in our educational system, because of the inductive teaching strategies followed by teachers. The teachers are not in a position to adopt the innovative methods of teaching successfully in actual classroom situations, due to various reasons like lack of interest, lack of training and other practical difficulties. It is presumed that a study of this type would help to develop meaningful and effective teaching-learning strategies among teachers and students. For the present study the investigator has selected the brain compatible learning method of teaching social studies for the students at secondary level.

Statement of the Problem

The statement of the problem selected for the research study is entitled as, "*Effectiveness of brain compatible learning on achievement in social studies among high school students*".

Objectives of the Study

1. To test the effectiveness of brain compatible learning in social studies by comparing the pre-test and post-test achievement scores of the experimental group and control group for the total sample.
2. To test whether there is any significant difference in the immediate post-test achievement scores of the experimental group and the control group, when the groups are exposed to experimental teaching.
3. To test the effectiveness of brain based learning in social studies by comparing the post-test achievement scores of the experimental group for the sub-samples: Gender and Locality.

Experimental Hypotheses

The experimental hypotheses formulated for the study are the following:

1. When the treatment groups (experimental group and control group) are exposed to experimental teaching (based on total sample):

There will be significant difference between the treatment groups with regard to immediate post-test achievement scores in social studies.

2. When the experimental group is exposed to experimental teaching (based on sub-samples) there will be significant difference between:

- (i) Male and Female students
- (ii) Rural and Urban students

with regard to immediate post-test achievement scores in History.

Method Adopted

The method adopted by the investigator for the present study was experimental method.

Experimental Design and Procedure

The experimental design adopted for the study was pre-test post-test non-equivalent parallel group design. The investigator selected 89 students of standard IX studying in CBSE stream of education. They were divided into experimental group (N=44) and control group (N=45). The study was conducted for 21 working days with 45 minutes duration for both experimental and control group. The experimental group was treated with brain compatible learning method and control group was treated with conventional method.

Sample of the study

The sample size for the study consisted of 89 students of Standard IX under CBSE stream of education, selected from a school in Kanyakumari district. Convenient sampling technique was adopted for the study.

Statistical Techniques Used

- i). Analysis of Variance - ANOVA
- ii). Analysis of Co-variance - ANCOVA
- iii) test of significance – t-test

ANALYSIS AND FINDINGS

Comparison of Pre-test and Post-test Achievement Scores of Brain compatible learning Group and Conventional Method Group for the Total Sample using Analysis of Variance (ANOVA)

TABLE 1

Summary of analysis of variance of pre-test and post-test achievement scores of

Brain Compatible Learning group and Conventional Method group

Source of Variation	df	SSx	SSy	MSx	MSy
Among means	1	6.879	22472.245	6.879	22472.245
Within groups	87	2512.177	8772.137	28.876	100.829
Total	88	2519.056	31244.382		

$F_x = 0.238$; $F_y = 222.874$: From Table for df 1/87: F at 0.05 level = 3.95: F at 0.01 level = 6.92,

From the above table it is concluded that the treatment groups (Brain Compatible Learning Group and Conventional Method Group) do not differ significantly with regard to pre-test achievement scores. Since the obtained value of F_y ($F_y = 222.874$; $p < 0.01$) is greater than F at 0.01 level (i.e., 6.92) it can be concluded that the brain compatible learning Group and conventional Method Group differ significantly with regard to post-test achievement scores at 0.01 level of significance.

Comparison of post-test achievement scores of the Brain Compatible learning group and Conventional Method group for the total sample using Analysis of Co-variance (ANCOVA)

The sum of squares, mean square variances and F ratios for the pre-test and post-test achievement scores of the brain compatible learning group and conventional method group were calculated. The details of analysis are given in Table.

TABLE 2

Summary of Analysis of Co-variance of pre-test and post-test achievement scores of Brain Compatible Learning group and Conventional Method Group

Source of Variation	df	SSx	SSy	SSxy	SSy.x	MSy.x	SDy.x
Among means	1	6.879	22472.245	393.172	21496.13	21496.13	7.837
Within groups	86	2512.177	8772.137	2960.929	5282.296	61.422	
Total	87	2519.056	31244.382	3354.101	26778.426		

$F_{y.x} = 349.974$: From Table for df 1/86: F at 0.05 level=3.95: F at 0.01 level = 6.92.

The obtained value of F is 349.974 and is greater than the table value at 0.01 level (i.e., 6.92) and hence is significant ($F_{yx} = 349.974$; $p < 0.01$). This shows that the final mean scores of treatment groups differ significantly after they have been adjusted for difference in the pre-test achievement scores.

TABLE 3

Data for adjusted means of post-test Achievement Scores of the Brain Compatible Learning Group and Conventional Method Group

Groups	N	Mx	My	My. x (Adjusted)
Brain compatible learning group	44	17.023	55.205	54.877
Conventional method group	45	16.467	23.422	23.75
General means		16.745	39.313	

$GMx = 16.745$: SED between adjusted means = 1.662

Calculated t value = 18.733: From Table t for df 86: t at 0.05 level = 1.99

t at 0.01 level = 2.63.

From the analysis of the total scores of the students in the brain compatible learning and conventional method learning groups using the statistical technique analysis of co-variance, it is clear that teaching based on brain compatible learning is more effective than conventional method with regard to achievement in social studies.

Comparison of Post-test Achievement Scores of the Brain Based Learning

Group for the Sub-Samples

To determine whether the sub-samples like gender and locality affect the immediate post-test achievement scores, the differential effect of the above mentioned sub-samples were studied. The details regarding the data and the result of the test of significance for differences between means of immediate post-test achievement scores for the sub-samples of brain compatible learning group are given in the following Tables.

TABLE 4

Test of Significance of difference between the Means of Post-test Achievement Scores for the Sub-Sample: Gender

Sub-Sample	Category	N	M	S D	t	L S
Gender	Male	27	59.556	10.156	0.807	N S
	Female	17	57.118	9.081		

It is evident from the Table that the critical ratio obtained for the sub-sample gender is not significant at any level. Hence it can be concluded from the analysis that post-test achievement scores of the brain compatible learning group was not influenced by the Sub-Sample: Gender.

TABLE 5

Test of Significance for difference between the Means of Post-test Achievement Scores for the Sub-Sample: Locality

Sub - Sample	Category	N	M	S D	t	L S
Locality	Rural	23	59.435	10.449	0.076	N S
	Urban	21	59.667	9.229		

It is evident from the Table that the critical ratio obtained for the sub-sample locality is not significant at any level. Hence, it can be concluded from the analysis that post-test achievement scores of the brain compatible learning group was not influenced by the Sub-Sample: Locality.

EDUCATIONAL IMPLICATIONS

1. The findings of the study indicated that brain compatible learning is effective in enhancing the level of achievement in social studies. Hence the teaching community shall adopt this method to transact the curriculum materials meaningfully for students at all levels to learn the facts, concepts and principles effectively and meaningfully.
2. The study also revealed that this method is highly effective for various categories of students based on gender and locality. So brain compatible learning shall be used as an innovative technique in teaching and learning for students belonging to different categories.
3. The use of brain based learning will be of great help for the students to learn according to their intellectual capacity in concept formation and retention of the acquired concepts. Hence curriculum planners can utilize the outcomes of this investigation for planning curriculum at different levels of education.
4. Brain based learning furnishes a learning environment that provides familiarity and suitability by that teacher shall provide learners with problem solving and critical thinking skills.

5. A great deal of real life activities shall be used by the teacher including classroom demonstrations, projects, field trips, stories, drama and interaction of different concepts. The study enables the prospective teachers to identify and understand the need and significance of constructing knowledge.
6. Since the outcome of the study seems to be effective, it can also be utilized to revamp the existing school curriculum by giving due importance to innovative methods and techniques of teaching and learning.

CONCLUSION

According to constructivism theory, knowledge is not taught but it is acquired by the learner self through constructing new on the basis of previous knowledge. As social studies is considered as a compulsory subject for the students of secondary level education, it should be studied in an effective way by constructing more knowledge than conventional method of learning. The study revealed that brain compatible learning is more effective than conventional method and increased the academic achievement of the students in social studies. Therefore the teachers of different subjects should try to use the principles of brain compatible learning to design their lessons. Brain Compatible learning can be one of the alternative teaching approaches that can improve students' content mastery in learning the subject. Hence it is proposed that the teachers of different subjects should give importance to the brain based learning theory in the class room teaching.

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