"EFFECTIVENESS OF BRAIN DOMINANCE STRATEGIES ON ACHIEVEMENT IN MATHEMATICS AMONG UPGRADED SCHOOL STUDENTS".

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ABSTRACT:

The researcher aims to determine the Effectiveness of Brain Dominance Strategies (BDS) on Achievement in Mathematics (AM) of 8th grade students. The type of this research is a True experimental (Parallel design) study. The population of this study was the 8th grade students of Upgraded school in Davangere District. The sample of this research consisted of two classes namely 8th -A grade as an experimental class and 8th - B as a control class. Based on the results of the research, it was obtained that average score of the pre-test in experimental class is **11.6364** with standard deviation (s) is **3.29600**. After given the treatment, the average score of the post-test in experimental class is **24.6667** with standard deviation (s) is **3.88641**. According to the observation of the brain dominance strategies, which include teaching and students activities are quite active. Based on the results of two tailed t-test for post-test data in experimental class was significant. Therefore, Based on the results of this research, it can be concluded that the BD S effected on student's AM of 8th grade students.

Key Point: BDS- Brain Dominance Strategies, AM- Achievement in Mathematics

1.0: INTRODUCTION:

The Brain dominance has been considered as the cognitive feature of the students. Brain is the coordinating organ of the body. It decides the nature of responses to be delivered for the stimulus. Hence, the brain has been considered as the controlling part of the living being. Such a significant organ has to be reined and termed in such a way, so to bring the positive outcome from the learners. The students having the hemispherical dominance can overcome the learning difficulties, can also decide and practice the feasible learning styles. Brain Dominance helps the learners to gain essentialities in the learning sectors as well as reasoning abilities and adjustment behavior. The brain associated coping skills and psychological techniques will also make the learners acquire the skill to attain the Brain Dominance.

The Brain dominance is a principle which support that a brain is composed by parts, hemisphere or quadrants, not equals, but asymmetric and functionally specialised and where one part is dominant relatively to the others. The left side of the brain is responsible for controlling the right side of the body. It also performs tasks that have to do with logic, Such as in science and mathematics. On the other hands the right hemisphere coordinates the left side of the body, and performs tasks that have done with creativity and the arts.

The brain is complex and hard-working organ. It is made up of as many as hundred billion neurons or brain cells but only weights 3 pounds (1400-2000gm). It is an energy-intensive organ, making up around 2% of a person's weight but using a huge 20% of the body's energy.

2.0 : THEORETICAL FRAMEWORK: -

Morris(2005) indicated that Ned Hermann who is the father of Brain dominance Technology drew on Sperry's work and developed the theory. He then went into develop a questionnaire. It is called as "Hermann Brain Dominance Instrument (HBDI)"By this model the brain is divided into 4 different systems and styles which are listed below.

A: Left cerebral hemisphere -Analytical
B: Left limbic system -Sequential
C: Right Limbic system -Interpersonal
D: Right Cerebral hemisphere -Imaginative

According to the notes of Morris (2005),"A related but independent theory is the theory of Multiple intelligences developed by Howard Gardner(1983).He identified seven types of intelligence. They are,

- Verbal- Linguistic
- Logical- Mathematical
- Visual- spatial
- Body – Kinaesthetic
- Auditory – Musical
- Inter-personal communication
- Intra-personal communication

Later he added two more they are, i) Naturalist intelligence &

ii) Existentialist intelligence

Rotter's (1954) social learning theory occurrence of reinforcement is contingent on his/her own behaviour factor of reinforcement. They are divided the factors as internal Brain Dominance and external Brain Dominance. According to him internal brain dominance perception of positive or negative event, take once own actions, one's own personal control, give personal efforts and decisions. External brain dominance is the individual's behaviour guided by fate, luck and other external circumstances.

In psychology Brain Dominance was originally developed by Julian Rotter in 1950's. Brain Dominance represents how a person's decision-making ability is influenced. Essentially those who make choices primarily on their own are considered to have internal brain dominance people with external brain dominance are generally more likely to be stressed and suffer due to depression as they are more aware of work situations since those who make decisions about based more on what other think are said to have external dominance".

3.0: NEED AND IMPORTANCE / SIGNIFICANCE OF THE STUDY: -

Academic performance is assessed differently in various courses. In schools, assessment of academic competence is divided into assessment of cognition and assessment of behaviour in practice as proposed by Miller's hierarchical model in 1990. Cognition or knowledge is assessed most commonly by the written method such as Multiple-Choice Questions (MCQs), Modified Extended Questions (MEQs), Short Answer Questions (SAQs)

and Essay questions. Assessment of scientific practice is done by Objective Structured Scientific Examination, short cases, long cases and collections.

Many studies have been carried out to associate various factors that may influence one's academic performance. Different brain dominance amongst individuals is a widely known fact. As each hemisphere of the brain contributes to certain different functionalities of our body, different persons tend to have their own unique ways of perceiving given information and strategize thereafter in order to respond. Different brain dominance affects the way in which one studies the best. There is no definite answer to which brain dominance belongs to the more successful individuals as each hemisphere of the brain is not superior to the other, instead have different specialized functions each. However, few researches have proved that left brain dominant students perform better academically. One of the Factor affecting academic performance is brain dominance.

Among the learning styles, brain hemisphericity, or to put it in more special terms, brain specialization has attracted the attention of some researchers. Tendero (2000) reported Sperry's study (1977) in which he propounded his split-brain model of intelligence as a result of his works on aphasic patients. In his seminal work he attributed some functions to different hemispheres of the brain. Brain has two hemispheres that are assigned different functions. Hergenhahn & olson (2005) stated that body functions have been assigned to both hemispheres "evenly but in a crossed fashion" (Kok, 2010). Simply put, the right hemisphere is in control of the left side of the body and vice versa. Using Tendero's (2000) metaphorical statement about brain dominance, "In a sense, the body cannot serve two masters" We can state that often one side of the brain is dominant over the other. In a similar vein.

Brown (1994) maintained that "the left hemisphere is associated with logical, analytical thought, with mathematical and linear processing of information. The right hemisphere perceives and remembers visual, tactile and auditory images; It is more efficient in processing holistic, integrative and emotional information".

Krashen (1988) maintained that "left hemisphere is superior to the right in judging temporal order, deciding which of the two stimuli was presented first". Brown (2007) reports Torrance's study (1980) in which he enumerated some of the features of the left and right brain dominant learners:Left-brain dominant learners: Intellectual; remember names; respond to verbal instruction and explanations; experiment systematically and with control; make objective judgments; planned and structured; prefer established certain information; analytic readers; reliance on language in thinking and remembering; prefer writing and talking; prefer

multiple choice tests; control feelings; not good at interpreting body language; rarely use metaphors; favour logical problem solving ,

Right-brain dominant learners: Intuitive; remember faces; respond to demonstrated ,illustrated or symbolic instructions; experiment randomly and with less restraint; make subjective judgments; fluid and spontaneous; prefer elusive uncertain information; synthesizing readers; reliance on images in thinking and remembering; prefer drawing and manipulating objects; prefer open-ended questions; more free with feelings; good at interpreting body language; frequently use metaphors; favour intuitive problem solving.

This study investigates if students' brain hemisphericity is one of those factors affecting Mathematics Achievement. Researchers interested in this sphere, can examine the effects of different Strategies related to one's brain hemisphericity on learning Mathematics and recommended to replicate this study in different contexts to verify or reject the extent to which the findings of this research can be generalized to other contexts.

4.0 : OBJECTIVE:-

1. To study the effectiveness of brain dominance strategies on achievement in Mathematics.

5.0 : HYPOTHESIS: -

1. There is no significant difference in pre-test mean score of achievement in Mathematics between control and experimental group.
2. There is no significant difference in the post-test mean scores of achievement in Mathematics between control and experimental group.
3. There is no significant difference in achievement in Mathematics between pre-test & post-test mean scores of control group.
4. There is no significant difference in achievement in Mathematics between pre-test & post-test mean scores of Experimental group.
5. There is no significant difference in achievement in Mathematics between post-test & delayed post-test mean scores.

6.0 : VARIABLES OF THE STUDY:-

The investigator selected the following variables for this study.

6.1 : Dependant Variable:

Mathematical Achievement

6.2 : Independent Variable:

- Teaching through Brain Dominance Strategies
- Conventional Method of teaching

7.0 : RESEARCH METHODOLOGY: -

In the present study researcher adopted pre-test post-test experimental and control group design (parallel group) under true Experimental Method.

7.1 : DESIGN OF THE STUDY:

	Pre-test	**Treatment**	**Post-test**	**Delayed Post-test**
Experimental Group	Achievement in Mathematics	Teaching through brain dominance Strategies	Achievement in Mathematics	Achievement in Mathematics
Control Group	Achievement in Mathematics	Teaching through Conventional Approach	Achievement in Mathematics	

8.0 : Sampling:

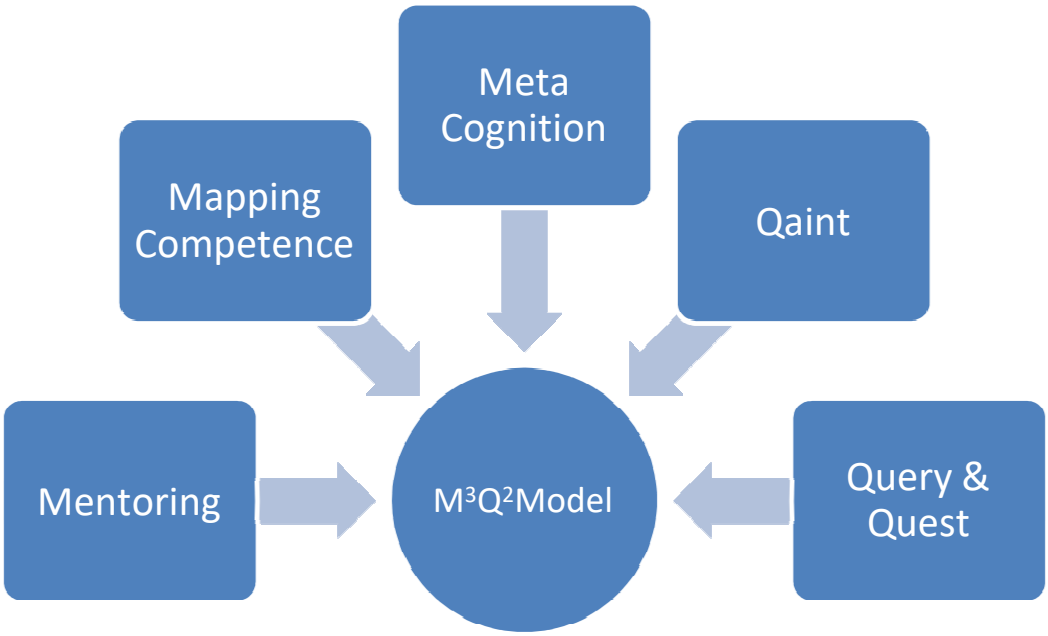
In the present study, researcher adopted purposive sampling technique. Sample of the study consists of each 33 students for both control group and experimental group. They are studying in Anjum Higher Primary School in Davangere District.

There are 75 Students in 8^{th} grade of Anjum higher primary School. Firstly Brain Dominance Scale (SLOT) was given for 75 students to identify dominancy level. Among them 66 students got left dominancy, 5 Students got

Right dominancy, 4 Students got whole dominancy. For left dominancy 66 students, Raven's progressive matrices test (non-verbal) was given to group them into control & experimental group homogenously of 33 students in each group.

8.1 : Brain Dominance Package:

Package consists of teaching and learning strategies. Teaching was done by using M^3, Q^2 Model prepared by the researcher after validating by the experts. Learners were actively participated in different activities and self prepared models.



- Mentoring: - Advice to a learner.
- Mapping Competence: - Planning & Presenting Information in Visual mode.
- Meta Cognition: - Ability to reflect one's own thinking and learning.
- Quaint: - Attractive & Unique Methods, Charts etc.
- Query & Quest :- a question, an inquiry, doubt or act of reaching for something

9.0: TOOLS FOR THE STUDY:

The following tool will be used for the present study.

Sl No.	Name of the tool	Developed By
1.	Brain Dominance Scale (SOLAT)	Developed by Venkataraman
2.	Brain Dominance strategies Package	Developed by Researcher. It involves teaching and learning Strategies.
3.	Achievement in Mathematics	Developed by Researcher. It consists of 30 questions from three areas of Mathematics Such as Arithmetic, Algebra & Geometry (10 questions from each Area)

10.0: STATISTICAL ANALYSIS AND INTERPRETATION OF DATA

Hypothesis-1

There is no significant difference in pre-test mean score of achievement in Mathematics between control and experimental group.

Achievement In Mathematics		Mean	N	Std. Deviation	Gain scores	t- value	Level of significance at 0.01 level
PRE-TEST	Experimental Group	11.6364	33	3.29600	-0.24242	0.342	Not-significant
	Control Group	11.8788	33	2.61913			

Interpretation:

The table reveals that, obtained t-value 0.342 is less than theoretical value 2.56. So, the obtained t-value is not significant at 0.01 level of significance. Hence accepted the null hypothesis and it is concluded that “There is no significant difference in pre-test mean score

of achievement in Mathematics between control and experimental group". The mean of the both the groups are 11.6364 and 11.8788; SD is 3.29600 and 2.61913 respectively & gain Score is -0.24242. Hence the mean were almost same. Consequently it is assured that both the groups were equivalent to each other before beginning of the experiment.

Hypothesis-2

There is no significant difference in the post-test mean scores of achievement in Mathematics between control and experimental group.

Achievement In Mathematics		**Mean**	**N**	**Std. Deviation**	**Gain scores**	**t-value**	**Level of significance at 0.01 level**
POST-TEST	**Experimental Group**	24.6667	33	3.88641	11.84848	12.762	Significant
	Control Group	12.8182	33	2.95227			

Interpretation:

The table reveals that the obtained t-value 12.762 is greater than the theoretical value 2.56. at 0.01 level of significance. Hence, the null hypothesis is rejected and formulated alternative hypothesis that is, "There is a significant difference in the post-test mean scores of achievement in Mathematics between control and experimental group". The mean scores of the both the groups are 24.6667 and 12.8182, SD are 3.88641 and 2.95227 respectively & gain Score is 12.762. Therefore Mathematical Achievement of Experimental Group is higher than Control group after giving treatment for Experimental group. Teaching through Brain Dominance Strategies is more effective on achievement in Mathematics compare with teaching through traditional method.

Hypothesis-3

There is no significant difference in achievement in Mathematics between pre-test & post-test mean scores of control group.

Achievement In Mathematics		Mean	N	Std. Deviation	Gain scores	t-value	Level of significance at 0.01 level
CONTROL GROUP	**Pre-Test**	11.8788	33	2.61913	-0.93939	2.087	Not Significant
	Post-Test	12.8182	33	2.95227			

Interpretation:

The table reveals that, obtained t-value 2.087 is less than theoretical value 2.56. So, the obtained t-value is not significant at 0.01 level of significance. Hence accepted the null hypothesis and it is concluded that "There is no significant difference in achievement in Mathematics between pre-test & post-test mean scores of control group". The mean of the both the groups are 11.8788 and 12.8182, SD are 2.61913 and 2.95227 respectively & gain Score is -0.93939. Therefore the mean were almost same. Consequently it is assured that both the tests were equivalent to each other after traditional class.

Hypothesis-4

There is no significant difference in achievement in Mathematics between pre-test & post-test mean scores of Experimental group.

Achievement In Mathematics		Mean	N	Std. Deviation	Gain scores	t-value	Level of significance at 0.01 level
EXPERIMENTAL GROUP	**PRE-TEST**	11.6364	33	3.29600	-13.03030	16.571	Significant
	Post-Test	24.6667	33	3.88641			

Interpretation:

The table reveals that the obtained t-value 16.571 is greater than the theoretical value 2.56. at 0.01 level of significance. Hence, the null hypothesis is rejected and formulated alternative hypothesis as "There is a significant difference in achievement in Mathematics between pre-test & post-test mean scores of Experimental group". The mean of the both the

groups are 11.6364 and 24.6667, SD are 3.29600 and 3.88641 respectively & gain Score is 13.03030. Therefore Mathematical Achievement of Experimental Group is higher in post test after experimental treatment.

Hypothesis-5

There is no significant difference in achievement in Mathematics between post-test & delayed post-test mean scores.

Achievement In Mathematics		Mean	N	Std. Deviation	Gain scores	t-value	Level of significance at 0.01 level
EXPERIMENTAL GROUP	**Post-Test**	**24.6667**	**33**	**3.88641**	-1.63636	3.103	Significant
	Delayed Post Test	**26.3030**	**33**	**2.53087**			

Interpretation:

The table reveals that the obtained t-value 3.103 is greater than the theoretical value 2.56. at 0.01 level of significance. Hence, the null hypothesis is rejected and formulated alternative hypothesis as "There is a significant difference in Mathematics between post-test & delayed post-test mean scores". The mean of the both the groups are 24.6667 and 26.3030, SD are 3.88641 and 2.53087 respectively & gain Score is -1.63636. Therefore Mathematical Achievement of Experimental Group is higher in delayed post test after experimental treatment using Brain Dominance Strategies. This shows that experimental treatment will help students to retain Mathematical concepts for longer time.

11.0 : MAJOR FINDINGS

1. There is no significant difference in pre-test mean score of achievement in Mathematics between control and experimental group. The mean were almost same. Consequently it is assured that both the groups were equivalent to each other before beginning of the experiment.
2. Teaching through Brain Dominance Strategies is more effective on achievement in Mathematics compare with teaching through traditional method. So There is a significant difference in the post-test mean scores of achievement in Mathematics between control and experimental group

3. There is no significant difference in achievement in Mathematics between pre-test & post-test mean scores of control group. The mean were almost same. Consequently it is assured that both the tests were equivalent to each other after traditional class
4. Mathematical Achievement of Experimental Group is higher in post test after experimental treatment. So There is a significant difference in achievement in Mathematics between pre-test & post-test mean scores of Experimental group.
5. Experimental treatment will help students to retain Mathematical concepts for longer time. So "There is a significant difference in Achievement in Mathematics between post-test & delayed post-test mean scores"

12.0 : Conclusion & suggestion:

Based on the results of the research and discussion as well as conclusions, the authors would like to give suggestions to carry out further research to students at different levels of education units, and by taking a larger sample. Thus, these Strategies is expected to be used as one of the important indicators in the preparation of the curriculum, especially in Mathematics lessons that are even better in the future. This study shows that there is a significant effect of Brain Dominance Strategies on the students' academic achievement in Mathematics among 8^{th} grade students of Davangere District.

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